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INFERENCING STRATEGIES, NARRATIVE DISCOURSE AND THE GRADE SIX AVERAGE READER: A TEACHING STUDY

BY



SHAUNEEN O'SHAUGHNESSY

A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled INFERENCING STRATEGIES, NARRATIVE DISCOURSE AND THE GRADE SIX AVERAGE READER: A TEACHING STUDY submitted by SHAUNEEN O'SHAUGHNESSY in partial fulfilment of the requirements for the degree of MASTER OF EDUCATION.

TO MY STUDENTS

ABSTRACT

A major purpose of this study was to design and implement a reading instruction program focusing on inference as one of the processes essential in reading comprehension, and in particular, the inferencing strategies identified by Phillips-Riggs (1981) as those used by grade six readers to generate inferences when reading narrative discourse. The instructional program aimed at altering average grade six readers' inferencing behavior by increasing their use of those strategies determined by Phillips-Riggs to be effective in inference generation, and by minimizing their use of those strategies determined by Phillips-Riggs to be ineffective in generating inferences. A second purpose of the study was to determine the effects of this instructional program on overall reading comprehension.

Fifteen average grade six readers, eight boys and seven girls, were randomly assigned to one of two groups, i.e. experimental which participated in the instructional program, and control, which received no instruction.

Prior to the instruction, all subjects were administered The New Developmental Reading Test, Form A, as a group, and a test passage of narrative discourse individually. After instruction, all subjects were administered The New Developmental Reading Test, Form B, as a group, and an alternate test passage of narrative discourse individually. The passages used for testing were controlled for length, content and reading level. Each test passage was 550 words in length, and was divided into nine episodes each, accompanied by a number of inference questions. During testing, the subject read each episode silently and was asked to

comment about what had been read, to answer inference questions, and to give reasons for inferences generated. Once neither the student nor the investigator had any further comments or questions, the student read the next episode and the procedure was repeated until the passage had been completed. Students' responses to the test passage included free recall, introspective comments and answers to inference and probe questions. Responses to The New Developmental Reading Test, Forms A and B, were compared within and across groups to assess the effects of the instructional program on overall reading comprehension. Responses to the narrative test passages were analyzed to determine inferencing strategies used, and results were compared within and across groups to assess the effects of the instructional program on subjects' use of effective and ineffective inferencing strategies.

During instruction, subjects received an initial group lesson aimed at developing an awareness of the process of inference and inferencing strategies. Subsequently students were met individually to read several narrative passages developed and presented according to the same guidelines and procedures as those used for the pretest and posttest passages. Inferences generated by students while responding to narrative passages were discussed in terms of inferencing strategies. Students were encouraged to increase the use of effective strategies and minimize the use of ineffective strategies.

Results of the study showed that although the instructional program did not have a significant effect on overall reading comprehension, it did have a significant effect on increasing students' use of effective inferencing strategies and decreasing students' use of ineffective strategies.

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CHAPTER I

INTRODUCTION

Reading researchers and educators have long recognized that the acquisition of meaning must be the ultimate goal of any reading program. While more attention has been directed to this area in recent years, our understanding of the process of comprehension remains less well-developed than our knowledge of the decoding process. In response to this problem a center for the study of reading whose central concern would be comprehension was proposed in 1976. Consequently, Durkin (1978) went to elementary classrooms to observe what was being done in the name of reading comprehension instruction. Following a systematic observation of classroom reading activities, Durkin concluded that little time was given to activities which could be classified as comprehension instruction. Based on her observations in classrooms, Durkin raised an interesting question about future research in reading comprehension. She asked, "If the observed teachers had been found giving time to procedures that we think represent comprehension instruction, would their students be better comprehenders than they are now (p. 527)?" This question provided the initial impetus for this study. If it is true that teachers spend little time in instructing in the area of reading comprehension, then surely we should look for ways to remedy that situation. Furthermore, we must also ask:

1. What should be taught?
2. How should it be taught?

In an attempt to determine the what and how of comprehension instruction, Cooper and Petrosky (1975) summarized the research which addressed this issue and reached three general conclusions. First, they suggested that "comprehension must precede the identification of individual words" (p. 93) in that the reader must intend to make sense of what is read prior to the reading. Second, they argued that "reading is not decoding to spoken language" because many aspects of spoken language including voice intonation, facial expression, body position and gesturing are impossible to imitate on the printed page. Third, and most important for the present study, they pointed out that "only part of the information necessary for reading comprehension comes from the printed page" (p. 93) in that the reader must wed existing knowledge with the printed message in order to "fill in the gaps", "read between and beyond the lines", or in other words, generate inferences. Inferencing allows the reader to understand the author's implicit meaning and, therefore, is an essential process in comprehending written text. Consequently, in considering the question, "What should be taught?" this investigator focused on the process of inference.

The process of inference in reading comprehension has been explored from different points of view, by many reading researchers. Some have sought a greater understanding of the process itself. Others have attempted to identify effective means for teaching the inferencing process.

Recent research which examines the comprehension process suggests that proficient readers use superior strategies to comprehend

and remember large units of text (Stanovich, 1980). Recognizing that possibility, other researchers have attempted to identify those superior strategies. In terms of the process of inference, Phillips-Riggs (1981) studied how readers generated inferences and identified ten inferencing strategies. The specific nature of those strategies is basic to this investigation and will be explored later; however, it is important to note now that Phillips-Riggs further categorized the ten strategies as Most Productive, Productive and Counterproductive in the generation of inferences.

If there really are inferencing strategies that can be identified as "most productive", "productive" and "counterproductive" then this raises a number of interesting questions for research in reading instruction. First, is it possible to design an instructional program to help readers increase use of Most Productive strategies? Second, could such a program also decrease those same students' use of Counterproductive strategies? Third, would such a program have an effect upon the students' overall reading comprehension abilities as measured by a standardized reading comprehension achievement test?

Thus far, we have seen that concerns are being raised about comprehension and comprehension instruction that require theoretical concerns to be wed to the practical aspects of instruction. In a small way, this study was designed to help us begin to achieve that goal by addressing the problem of whether or not readers can be taught to modify their use of inferencing strategies which might in turn improve their general abilities in comprehending written narrative discourse.

Purposes of the Study

This study attempted to wed theoretical knowledge of inference with that of teaching methodology in order to translate this knowledge into practical application. The study focused on instruction of inferencing strategies as one means of increasing readers' comprehension abilities. Within that broad context, the study had several major purposes. They were:

1. To develop an instructional program based upon strategies identified by Phillips-Riggs (1981) as those used by grade six readers in generating inferences. Specifically, the instructional program focused on four strategies determined by Phillips-Riggs to be Most Productive in making inferences, and three strategies determined by Phillips-Riggs to be Counterproductive in the generation of inferences;
2. To implement that instructional program with a group of average grade six readers;
3. To evaluate the pupils' abilities to increase use of Most Productive strategies following that instruction;
4. To evaluate the pupils' abilities to decrease use of Counterproductive strategies following that instruction.

In addition to the major purposes of the study, a fifth purpose was to evaluate the degree to which average grade six readers, on completion of the instructional program, increased their level of achievement in reading comprehension, as measured by a standardized reading test.

Definition of Terms

Definitions pertinent to this study are given below:

Reading Comprehension - a complex set of processes by which the reader interacts with the printed text in order to construct the meaning of the author. Of these, one is the process of inferencing.

Inference - information previously unstated by the author which is generated by the reader on the basis of the author's textually presented information.

Appropriate Inference - information previously unstated by the author which is generated by the reader on the basis of and within the constraints of the author's textually presented information (this definition used by McLeod, 1978 for "Inference").

Inference Strategies - procedures which enable readers to take what is stated in a text, relate their background knowledge to it, and derive its meaning (Phillips-Riggs, 1981).

Inferencing Strategies - ten inferencing strategies were identified by Phillips-Riggs. Of these ten, Phillips-Riggs identified four as Most Productive in generating inferences when reading narrative discourse. They were:

1. Shifting of Focus. When the reader cannot resolve the immediate question, the reader addresses surrounding questions in an effort to make a correct interpretation.
2. Analyzing Alternatives. The reader makes tentative interpretations which are held until more information is available.

3. Confirming an Immediate Prior Interpretation. The reader interprets a subsequent response so that it is consistent with the response immediately preceding.
4. Empathizing from Experience. The reader, on the basis of the data and personal experiences, projects himself into the situation and experiences another's condition which becomes part of his interpretation.

Three were identified by Phillips-Riggs as productive in generating inferences. These were:

1. Rebinding. The reader, upon making a possible interpretation, realizes immediately that this conflicts with previous interpretations and substitutes another interpretation.
2. Questioning a Default Interpretation and/or Direct or Indirect Conflict. In making an initial interpretation, the reader may have made an incorrect assumption or misinterpreted data. When subsequent information is in conflict, the reader questions previous interpretations and assumptions.
3. Confirming a Non-Immediate Prior Interpretation. Having made a previous interpretation, the reader considers alternate interpretations but on the basis of subsequent information, reverts to the earlier interpretations, confirming it as his choice.

Three were identified by Phillips-Riggs as Counterproductive in generating inferences. They were:

1. Assigning an Alternate Case. When interpretations do not fit existing data and subsequent information does not help clarify the interpretation, then an alternate interpretation is held apart from other information.
2. Assuming a Default Interpretation and Transforming Information. The reader makes an assumption based on incorrect knowledge.
3. Neglecting to Respond or Holding Information. The reader has no interpretation or makes an interpretation and rephrases it in a variety of variations without the addition of any new information.

A more complete explanation of each inferencing strategy and appropriate examples are included in Chapter III.

Narrative Discourse - text that represents a series of events that occur over time, are related through a causal or thematic chain, and may be represented pictorially (Fagan, Class notes, 1982).

Comprehension Instruction - the teacher does/says something to try to help the student understand or work out the meaning of more than a single isolated word (Durkin, 1978-1979, p. 488). For the purposes of this study, the teacher helps the student understand or work out the meaning of passages of narrative discourse by trying to develop an awareness of and an ability to use inferencing strategies through explanation, review of explanation, application, questioning, discussion and feedback.

Free Recall - a retelling of what has been read. Free recall most often includes information specific to the text.

Introspection - comments indicating what the reader thinks about what has been read. Introspection most often includes information that is inferential in nature.

Probe Questions - questions asked by the investigator which require the reader to give reasons for inferences made, clarify the students' thought processes, and focus on general story content. These questions may elicit information specific to the text as well as interpretations based on the textual information.

Interpretation - synonomous with inference.

Assumptions of the Study

1. It is assumed that inferencing strategies described as those used by proficient and less proficient readers can also be used by the average readers in this study.
2. It is assumed that the strategies worked with in this study are similar to those used by proficient readers when reading on their own.

Research Questions and Null Hypotheses

In determining the effectiveness of the instructional program designed and implemented in this study, three major research questions were addressed. Because the statistical procedures called for the statement of null hypotheses, each question is followed here by its corresponding null hypothesis:

Research Question 1a. Would average grade six readers who participated in an instructional program designed to modify use of inferencing strategies increase the percentage of Most Productive

strategies used following instruction?

Null Hypothesis 1a. That the instructional program, as set out in this study, will not be a factor in increasing the percentage of Most Productive strategies used.

Research Question 1b. Will the average grade six readers who participate in an instructional program designed to modify use of inferencing strategies decrease the percentage of Counterproductive strategies used following instruction?

Null Hypothesis 1b. That the instructional program, as set out in this study, will not be a factor in decreasing the percentage of Counterproductive strategies used.

Research Question 2. Will the readers participating in the instructional program increase their level of achievement in reading comprehension as measured by the New Developmental Reading Test, Form A and Form B, administered before and after instruction?

Null Hypothesis 2. That the instructional program, as set out in this study, will not be a factor in increasing reading comprehension ability as measured by the New Developmental Reading Test, Forms A and B.

Limitations of the Study

The investigator acknowledges the following limitations:

1. The instruction of inferencing strategies, as well as the generation of inferences, may be affected by many factors beyond the scope of this study. However, this is not unlike any other structured learning situation. Therefore, the investigator recognizes this as an unavoidable and not uncommon limitation.
2. The study was confined to grade six students who fell in the average range on standardized intelligence and reading comprehension test scores, and who agreed to participate. These students may not be representative of the total student population and therefore, findings will be constrained to this group only.
3. The study is limited to sixteen students. Because the sample is small, it may not be representative of the larger student population. The results must be viewed with caution and the generalizability is limited.
4. Efforts were made to simulate the real reading act as closely as possible by having subjects read each episode silently rather than orally before being asked to introspect and answer questions. However, the interrupted reading pattern used in the study is unlike the real reading act and generalizability is limited.
5. The instruction and analysis of data was done by one investigator/teacher and although the investigator attempted to minimize unequal treatment between control and experimental groups to as high a degree as possible, some distortion may have been unwittingly introduced.

6. Level of achievement in reading comprehension was measured by one standardized reading test, The New Developmental Reading Test (Bond, Balow & Hoyt, 1968). Results should be viewed with caution.
7. Length and frequency of instructional sessions was limited to one group lesson forty-five minutes in length, and eight individual lessons each twenty-five minutes in length. Results may be viewed only within this limited time scope.
8. Eight of the nine lessons were conducted individually. This is not representative of a normal classroom situation. Findings may be viewed only within this situation and generalizability is limited.

Significance of the Study

The significance of the study lies primarily in its attempt to translate theoretical knowledge into practical application. Its contribution to the existing body of knowledge concerning instructional focus and methodology is unique in that instruction of inferencing strategies and the effect of this instruction on reading comprehension is a relatively unexplored area.

This study endeavored to add to the existing body of research concerning the effects of instruction of the inference process by developing and implementing an instructional program with grade six average readers, testing, and analyzing the data gathered. The study focused on comprehending narrative discourse and could, in a small measure, expand understanding of the effect of instruction of inferencing strategies, and provide direction for future research. Phillips-Riggs stated, "The more extensively this process of reading is understood, then the more advances which can be made in terms of instruc-

tional materials and teaching practices" (p. 12).

Overview of the Investigation

The investigation of the effect of instruction of inferencing strategies in comprehending narrative discourse with average grade six readers consists of seven chapters. Chapter I introduced the problem and provided relevant background information, including assumptions basic to the investigation, the definition of terms, the research questions, and limitations of the study.

Chapter II outlines existing research relating to inference as one of the processes of reading comprehension. The literature was selected on the basis of its contribution in providing direction for the instructional focus and methodology used in this study, as well as materials used for testing and instruction.

Chapter III describes the plan for the design and presentation of the narrative passages and inference questions used in testing and instruction.

Chapter IV details plans for the methodology and implementation of the instructional program.

Chapter V describes the pilot investigation used to test the design and presentation of the narrative discourse passages and accompanying inference questions, and the methodology and implementation of the instructional program. Changes made as a result of the pilot study are described.

Chapter VI outlines the design of the study including the selection and description of the sample; the assignment of subjects to the experimental and control groups; a description of the research

instruments used to collect the data; a description of the instructional program used to conduct the study; and modifications made in the design of the study as a result of the implementation of the instructional program. The data collection and instruction schedules are presented.

Chapter VII focuses on the coding and analysis of the data collected. It describes the preparation of the protocols for analysis, the definitions of the inferencing strategies, and the procedures used in assigning the strategies to the protocols. The analysis of student response to the New Developmental Reading Test, Forms A and B, is also discussed. The statistical analysis of the data is detailed.

The findings and conclusions pertaining to the effect of instruction on the use of inferencing strategies and reading comprehension ability are presented in Chapter VIII.

Chapter IX provides a summary of the study and presents the conclusions drawn from the previous chapter. The implications of this research for further studies which focus on the inference process and for pedagogical practice are discussed.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This review of the literature provided the background and historical perspective to the strategies approach to comprehension instruction which is the concern of the study. The chapter is organized into five sections with the first four touching on the following issues:

1. The identification and measurement of inference as an element of comprehension.
2. The function of inference in reading comprehension.
3. Strategies used by readers in generating inferences.
4. Instruction of the process of inference.

The fifth section outlines the manner in which past research led to the present study.

Inference: Focus on Comprehension

The identification of inference as a separately distinguishable dimension of comprehension and the development of tests which would measure this dimension are closely interwoven. For this reason, these elements are dealt with interactively here.

Although inference, as a dimension of comprehension, was not studied directly in the early part of this century, elements which were inferential in nature were frequently identified and briefly explored. As early as 1894, Binet and Henri (in Goetz, 1977, p. 10) in analyzing recall of stories, noted "errors through imagination" which were characterized not by a change in meaning but rather as an addition

to the meaning of the original version. In 1926, Carroll, in identifying areas in which errors were made when reading directions, included "ideas that are merely implied, that are not stated definitely and clearly in the sentence or paragraph" (p. 31). He suggested that errors made in this area were due to not carefully thinking things through or by not "thinking facts together" (p. 31). He compares this to what Thorndyke referred to in 1917 as "the reasoning elements in reading" (in Davis, 1942, p. 367). Berry (1931), in summarizing the skills characteristic of a good reader, included the ability to infer the meaning of unknown words by use of context (in Davis, 1968, p. 503).

One of the earliest studies to focus on inference was conducted by Tyler (1930) who described a method of measuring the ability to infer. A series of descriptions, comprised of zoological facts not known to the participants, were used as test items to help ensure that subjects generated their own inferences rather than drawing on memory. Sixty-six elementary subjects read each item and then completed two tasks. Task One required students to generate their own inferences about what they read, while Task Two required subjects to select the best inference from a series. A correlation coefficient of .38 was obtained. Tyler concluded that multiple choice tests designed to determine students' abilities to generate inferences may not accurately assess those abilities.

Dewey (1934-1935) in defining inferential thinking in reading as "the ability to evaluate, to read between the lines, and to understand the significance of what is read" (p. 346), compared students' abilities to secure facts and do inferential thinking when

reading historical material. Dewey's sample consisted of sixty children from a small western town and eighty children from a large middle western city for a total of 140 children. Four tests, each containing both factual and inferential questions, were used to assess the subjects' understanding of American history articles. Two articles were simple to read, while two were more difficult. Each group read one simple and one difficult article. After the tests had been scored, the items testing the acquisition of facts were separated from those items which tested inferential thinking, and correlations were determined. Dewey concluded that there was little relation between the two abilities. Results were in close agreement with those of Tyler (1930). Dewey stressed that pupils should be trained to do inferential thinking to increase reading comprehension, and that tests which would measure both literal and inferential comprehension should be developed.

Feder (1938), in working on the premise that differences in reading "maturity" would surface in the ability to perceive the interrelationship of ideas, developed a series of Comprehension Maturity Tests which would measure that ability. The first test developed assessed the areas of comprehension of factual material, appreciation, and ability to make inferences. For each area, Feder developed one reading passage and questions of increasing difficulty. The test was administered to more than seven hundred freshmen in one college. Feder concluded that there was a distinction between the areas being measured, particularly between the reading of factual information and the other two areas of reading for appreciation and reading for inference. A confounding factor was that a different reading passage was used for

each area and correlations may have been due to type of passage rather than test items. Feder revised the test to include only factual and inferential questions based on one reading passage fifteen paragraphs in length. A homogeneous sample of 99 sophomores was used in computing the test statistics. Correlations for the revised form corroborate the earlier findings and Feder concluded that reading for information and reading for inference were two apparently distinct types of reading.

In 1939, in preparation for the development of a reading comprehension test, Davis (1942) conducted a reading literature survey to determine the reading skills identified by authorities as the most important elements of reading comprehension. Among the nine clusters were three which Davis described as the ability to answer questions that are answered in a passage but not in words in which the question is asked, the ability to draw inferences from a passage about its contents, and the ability to draw inferences about the writer's intent, purpose and point of view. Davis organized those skills which appeared to have high correlations within themselves and low correlations with other skills into clusters. The resulting Cooperative Reading Comprehension Test, Form Q, used five-choice items to measure each of the nine reading skills. In another study, conducted by Davis as a by-product to the development of the Cooperative Reading Tests, Form Q, the test was administered to 421 college freshmen. The intercorrelations of the nine scores were determined and a factorial analysis was done. Nine principal components were obtained, two of which accounted for 89 percent of the variance. Davis concluded that the largest component was "clearly a measure of word knowledge" (p. 368), or

knowledge of word meanings, while the second largest component could be called "a measure of reasoning in reading" (p. 369), which Davis (1968) defined as "a combination of weaving ideas together and drawing inferences from them" (p. 544). Davis speculated that most reading tests in use at that time would largely measure word knowledge.

Davis' work received attention from many others in the field of reading, and the acceptance of his findings was controversial. Although recognizing that Davis had developed a comprehension test which would involve all factors, Johnson (1949) asserted that the general user of the test would rarely analyze individual scores and would give primary attention to the composite comprehension score. She stated, "For diagnostic purposes it is essential that the subject be rated in each major component of reading comprehension. If comprehension is a composite, then improvement may come only through improvement in the component parts" (p. 399). She further stated that "currently accepted tests of reading ability do not necessarily measure all its components. Word meaning, recall of facts and rate are emphasized" (p. 403). In this, she and Davis were in agreement.

A controversy has existed in the field of reading concerning the feasibility of measuring specific aspects of comprehension. While several studies, including that of Davis, supported the position that specific aspects of comprehension could be measured, results of other studies indicated that a single function was being measured.

In a study which reexamined six factors which Davis (1942) had found to be statistically different, Hunt (1957) attempted to wrestle with a more definitive view of comprehension. Could compre-

hension be best described in terms of multiple skills and abilities rather than a single or unitary function? Could specific factors be measured? Hunt reexamined the six skills identified by Davis as fundamental to reading comprehension. Results suggested that for each of the comprehension skills considered, other than vocabulary, the average differences are probably due to chance differences. The results of Hunt's analysis supported Davis' initial finding that word knowledge and reasoning in reading account for almost all the variance in comprehension. Hunt suggested that the whole question of the construction of diagnostic measures of reading comprehension needed further examination.

In 1968 Davis conducted a rigorous re-analysis of eight of the nine skills included in the earlier study in an effort to construct pure tests which would determine the unique variance of these skills. As a result of this study, he singled out five skills as being most significantly distinct. Two of these five skills were: 1) drawing inferences from content and 2) inferring a writer's purpose, attitude, tone, and mood.

In reaction to Davis' later study, Carroll (1969) asserted that inference is something more than comprehension and that it would be possible to comprehend the literal meaning of a passage without understanding its deeper significance. This would suggest that understanding what is being read consists of two phases: an understanding in the literal sense, and the inferring of a deeper meaning not stated explicitly in the text.

In response to differing interpretations made of the results of Davis' study, Spearritt (1972) conducted a study to further refac-

torize Davis' data by employing more comprehensive procedures available at the time. Results supported the hypothesis that four of the five skills, including the two inferential skills noted above, were identifiable as separate skills, and Spearritt thereby confirmed Davis' conclusions.

Although there is disagreement among researchers in the field of reading over the specific types of comprehension skills, the majority of studies have found reading comprehension to be comprised of the two broad categories of literal and inferential comprehension. However, there was little evidence of tests which would measure these two factors, and which would reveal specific skills within each factor.

In recognizing that reading comprehension is comprised of various abilities including the ability to make inferences, Developmental Reading Tests were developed in 1955 by Bond, Clymer and Hoyt to provide an analytical group test which would be diagnostic in nature and provide a profile of silent reading abilities, both literal, including facts and organization, and inferential, including evaluation and interpretation. However, lack of information provided by the publishers concerning reliability and validity rendered the tests meaningless. The original tests were revised to overcome this omission and other serious flaws. The New Developmental Reading Tests (1968) were the result. Frederick Davis, in evaluating the revised test stated, "The sum of scores on Parts 2 and 3 yields a good measure of literal comprehension of content.... [while] the combined scores of Parts 4 and 5 may perhaps be regarded functionally as a measure of reasoning in reading, even though it is labeled 'Creative Comprehen-

sion'" (p. 1091). Traxler, in reviewing this test, stated, "The standardization and statistical work on the test scores bears the mark of the professional in test construction and use" (p. 1092).

Pettit and Cockriel (1974) conducted a study designed to test specific skills within the categories of literal and inferential comprehension. Two tests developed by Pettit in 1970, the Literal Reading Comprehension Test (LRC) and the Inferential Reading Comprehension Test (IRC) were used. Pettit and Cockriel concluded that although all reading skills tend to be correlated, "literal reading comprehension and inferential reading comprehension are separately distinguishiable dimensions in reading" (p. 73) and that each of the tests measures more than one basic ability.

The findings of researchers seeking a greater understanding of the various component parts of comprehension have suggested that inference is a separate element of reading comprehension, that improving the reader's comprehension will come only through improvement in its component parts, and that both literal and inferential comprehension should be measured to accurately assess the reader's comprehension abilities.

Inference: Focus on Function

The delineation of inference as a separate dimension of reading comprehension and the development of tests which would measure this dimension with some degree of accuracy led to a variety of studies regarding inference and its role in aiding comprehension.

In a study designed to explore developmental change in the inferential processing and memory retrieval of sentences, Paris and

Lindauer (1976) asserted that the ability to derive inferences is important for children's comprehension and memory for what has been read. An additional purpose in conducting the study was to determine if young children could be made to process sentences to a deeper level by acting them out. This procedure was successful in increasing the young child's abilities to make inferences and remember what had been read. The researchers concluded that inferences "serve as functional retrieval cues for access to information stored directly during encoding, as well as for reconstruction of other potential relationships" (p. 224).

In a study conducted to examine how inferences are used by adult readers to aid comprehension of connected narrative discourse, Thorndyke (1976) concluded that inferences generated during comprehension are stored in memory with the text information to which they relate, and that the inference becomes undifferentiated from the information that appeared explicitly in the text. Thorndyke suggested that information read is clustered together with plausible inferences which provide coherence and continuity in contextual frames. He further conjectured that it is the contextual frame, containing both the information read as well as the inferences generated which is stored in memory rather than individual pieces of information. This would explain why the inferences become undistinguishable from the explicitly stated information. Thorndyke's conclusion that inferences generated during comprehension become undifferentiated from explicit text information was confirmed by Goetz (1977) in a study conducted to investigate the role of inference in the comprehension of and memory for text.

The work of these researchers suggested that the generation of inferences is important to comprehension of and memory for the text and provides coherence and continuity for the information read, and that children's abilities to generate inferences can be increased.

Inference: Focus on Teaching

As more researchers agreed that the ability to generate inferences was crucial in reading comprehension, an interest grew in determining effective teaching procedures to increase comprehension generally, and inferencing ability specifically. Many researchers, educators and curriculum writers viewed the ability to make inferences as an end-product of reading; one of the many in a long list of sub-skills. Others began to view inference as a process engaged in by the reader in order to comprehend. This was an important distinction because it influenced the design of teaching procedures used to increase comprehension. In viewing comprehension as a set of sub-skills, one common classroom procedure involved asking the student questions related to each of the sub-skills. This was based on the theory that modeling of questions related to each skill and practice in answering these questions would be effective in increasing the ability of the student in each of these areas, and thus increase comprehension overall.

In response to this practice, Jenkinson (1975) stated, "By directing the attention of the learner through questions based on sub-skills, we have hoped that we were promoting the development of comprehension in reading. Logically we have assumed that, if each of these skills has been practised separately, they will operate simultaneously when the individual is reading" (p. 1). Jenkinson

suggested that this assumption might be false. A process orientation to reading comprehension may provide a more effective instructional approach than would a skills orientation.

Cooper and Petrosky (1976) offer an insight into the skills versus process approach to reading comprehension by comparing a typical list of reading comprehension skills drawn from a textbook on developmental reading with their own list of reading strategies based on a process orientation. The skill list developed by Thomas and Robinson in 1972 (in Cooper & Petrosky, 1976) includes items such as grasping implied meanings and drawing inferences; understanding character and setting; and recognizing the author's tone, mood and intent (p. 196). The strategies list developed by Cooper and Petrosky (1976) includes items such as the reader reads to identify meaning rather than to identify letters or words; the reader takes an active role, bringing to bear his or her own knowledge of the world and of the particular topic in the text; and the reader reads as though he or she expects the text to make sense (p. 192). Cooper and Petrosky's strongest criticism about skill lists is that they have nothing to say about either the reading process or the processing of information. In other words, skill lists describe the "what" of reading rather than the "how". This is a crucial failure because skill lists give no assistance to teachers of reading in developing the reading ability of students. They further suggest that although the skill list is "quite clearly a useful outline for prereading and comprehension questions" (p. 197), these will not teach the students anything about reading and, in fact, are actually questions to test comprehension rather than develop it. Included among

reading skill lists criticized by Cooper and Petrosky is that of Davis (1968) derived from factor analysis and claimed by Davis to be basic skills in reading.

The implications for instruction are that reading teachers should develop an awareness of and enhance the use of strategies effective in bringing meaning to the print. This is supported by others in the field of education (Malicky, 1978; Meyers & Paris, 1978; Pugh, 1980; Beebe, 1981; Brailsford, 1981).

In response to a growing controversy regarding questioning as an effective method of increasing comprehension ability, Andre (1979) examined research directed to determining the effects on comprehension of different levels of questions asked in, before, or immediately after reading prose passages. He concluded that the studies examined were not carefully controlled or fully reported, and conclusions were questionable. However, Andre suggested that questions may influence learning by changing the learner's perceptions of his task and the strategies chosen to accomplish the tasks (p. 309).

Beebe and Phillips-Riggs (1980) proposed that an inference begins with the information stated in the text and should not contradict any of the author's ideas. Therefore, students must be able to support their inferences by referring to story detail and by explaining their reasoning from the text to the inference made, in order to understand how to use the text information efficiently. They emphasized that questions alone will not teach children how to generate inferences and that the discussion centered on providing reasons for inferences is essential.

Hafner and Palmer (1980) conducted a study to determine the effects of two methods of teaching reading comprehension and one method of teaching vocabulary on the reading comprehension and vocabulary achievement of ninth-grade students. One of the methods of teaching reading comprehension was "Loganar", (the LOGical ANALysis of cognitive Relationships). Comprehension pre-tests included the Davis Reading Test, Form 2D, and an inferential comprehension test derived from the Davis Reading Test. Fifteen students participating in eleven lessons conducted over a period of five and a half weeks read selections (not described by the investigators) and answered ten questions related to the skills found by Davis to be important in secondary and adult reading. Students were then asked to explain how they developed their answers. Where appropriate, the investigators helped students logically analyze the reading material in terms of the questions. Following the treatment period, subjects were post-tested for comprehension with the Davis Reading Test and an inferential comprehension test derived from the Davis reading test. Hafner and Palmer concluded that students taught by a Loganar method did significantly better than the control groups on both the reading comprehension post-test and the inferential reading comprehension post-test. However, because a description of the treatment of the experimental group and the forms used as post-tests were not made explicit, one must question the conclusions reached by the investigators. It is interesting to note that students were asked to give reasons for answers to comprehension questions given during instruction, a technique which was strongly recommended by Beebe and Phillips-Riggs (1980).

Hansen (1981), working on the assumption that children's spontaneous inferencing behavior could be altered, attempted to improve inferential comprehension of expository passages. She encouraged children to generate inferences by using their previous experiences to predict events in the story and provided practice in answering questions which required inferences to be made. Twenty-four subjects, all reading at the same instructional level were divided into three groups, and one of the experimental conditions, Strategy, Question or Control was randomly assigned to each group. Treatment of the Strategy group differed primarily in that subjects were encouraged to use their existing knowledge to make predictions before reading. The Question group received a steady diet of inferential questions. The Control group received traditional story introductions and a mix of literal and inferential questions based on the passage read. Treatment occurred on one of four days of instruction, all done by the investigator. Tests used to determine comprehension ability consisted of factual and inferential questions based on two expository passages at the subjects' instructional level, a free recall measure based on one expository passage, and the Stanford Achievement Test. Although both intervention techniques elicited superior comprehension on questions related to the stories used during instruction, data revealed that treatment effects barely transferred to the Experimentor-designed Post-tests. Measures based on free recall revealed that neither experimental instruction caused greater comprehension on the three forms of free recall than the traditional method of instruction. Results based on the standardized comprehension test revealed that children receiving

the Question intervention performed better than those in the other groups, and there was some evidence that the Strategy group performance exceeded that of the Control group. While results suggest that both instruction and practice have direct consequences on children's comprehension performance within an instructional setting, Hansen concluded, "Maybe the students needed more explicit explanations regarding the process of inferencing and its benefits, rather than having it primarily modeled as was done herein" (p. 415).

To date, the research in this area provides few answers for teaching methods which would be effective in altering children's inferencing behavior. However, some conclusions provide directions for further exploration:

1. A process orientation focusing on how a reader might process print for meaning may give more assistance to reading teachers in developing students' reading comprehension.
2. Questions alone will not teach children how to engage in the process of inferencing. It is crucial that students give reasons for inferences made to assist them in understanding how to use text information efficiently.
3. Encouraging children to utilize their own knowledge and experience when reading and providing practice in answering inference questions may be helpful in increasing ability to make inferences.
4. Students may benefit from explicit explanations regarding the inferencing process.

Inference: Focus on Reader Strategies

Stanovich (1980) proposed that the proficient reader has superior strategies for comprehending text. What are the strategies used by the reader? Which strategies would be identified as superior?

In a work designed to delineate the process of inferencing, Collins, Brown and Larkin (1977) identified problem-solving strategies used by adults to make inferences when reading. The use of these problem-solving strategies to generate inferences was indicated in the following manner:

1. If a new inference conflicts with one made previously, the reader reconsidered either the newly or previously generated inference.
2. If an inference conflicts with the text, the reader reconsiders the text information.
3. If the reader can't generate an inference that makes sense, then he or she asks questions about other related and non-related parts of the text to help constrain a new inference.
4. The reader thinks of several alternate inferences and tries out the most likely ones to determine which inference makes the most sense.

In discussing implications for teaching, Collins et al. stated, "By pinpointing the strategies that skilled readers use for dealing with difficulties in understanding, it should become clear what strategies unskilled readers must learn" (p. 30).

Phillips-Riggs (1981) synthesized existing research and thought from the areas of cognitive psychology, sociology and language with her own knowledge in developing a theory of inference to provide a framework for her study. In developing this theory six components

tentatively suggested as being fundamental to that theory were context, reading situation, writer, text, reader, and the reader-text encounter. Phillips-Riggs stated, "The reader's encounter with the text is based on information from prior knowledge, the text and various mental processes" (p. 66). It is within this final component, the Reader-Text Encounter, that Phillips-Riggs modified and further developed those adult inferencing strategies earlier identified by Collins et al. These modified strategies, one facet of the "mental processes" explored in depth by Phillips-Riggs, provided the focus for the second section of her study in which she identified differences in inferencing behavior between proficient and less-proficient readers. The procedures used by Phillips-Riggs to determine differences in inferencing behavior included several tasks. Criteria were established to guide the development of passages used in the study to tap the inferencing strategies used by readers at both levels of proficiency. All passages required that the reader would have to generate inferences to comprehend the passage. Each passage was controlled for length, structure and content, and divided into several episodes or major events. The inference questions developed for the passages necessitated the generation of inferences. A method of presentation was determined in which each passage was introduced by providing a focus for further reading, students read each episode aloud and introspected about what had been read. Inference questions were asked where the subject did not make inferences freely during introspection, and probe questions were asked to further clarify the subject's understanding of what had been read. The subject then continued to read the next episode and the same pro-

cedures were followed until the passage was completed. The protocol , which consisted of 1) introspective comments on what the reader thought about what had been read and why and 2) answers to inference and probe questions, were taped and transcribed. Use of the strategies was determined by studying each protocol in conjunction with the passage read. This procedure is supported by Fredericksen (1975) who suggested that "by comparing a detailed model of subjects' text recall to a detailed model of the presented text, it may be possible to reconstruct the processing operations which a subject applied to an input text to generate the derived semantic information in his text recall" (p. 164).

Phillips-Riggs identified ten strategies used by the grade six readers in her study to generate inferences. Of the ten, four strategies stood out as those which were most productively used by children in generating inferences to understand narrative discourse. Those four are described as:

> Shifting of Focus. When the reader cannot resolve the immediate question, the reader addresses surrounding questions in an effort to make a correct interpretation.
>
> Analyzing Alternatives. The reader makes tentative interpretations which are held until more information is available.
>
> Confirming an Immediate Prior Interpretation. The reader interprets a subsequent response so that it is consistent with the response immediately preceding.
>
> Empathizing from Experience. The reader on the basis of the data and personal experiences projects himself into the situation and experiences another's condition which becomes part of his interpretation.

Of the six other strategies identified by Phillips-Riggs, three were classified as 'Productive' and three were classified as 'Counterproductive'. The strategies identified as Productive were:

> Rebinding. The reader, upon making a possible interpretation, realizes immediately that this conflicts with previous interpretations and substitutes another interpretation.
>
> Questioning a Default Interpretation and/or Direct or Indirect Conflict. In making an initial interpretation, the reader may have made an incorrect assumption or misinterpreted data. When subsequent information is in conflict, the reader questions previous interpretations and assumptions.
>
> Confirming a Non-Immediate Prior Interpretation. Having made a previous interpretation, the reader considers alternate interpretations but on the basis of subsequent information reverts to the earlier interpretations, confirming it as his choice.

The strategies identified as Counterproductive were:

> Assigning an Alternate Case. When interpretations do not fit existing data and subsequent information does not help clarify the interpretation, then an alternate interpretation is held apart from other information.
>
> Assuming a Default Interpretation and Transforming Information. The reader makes an assumption based on incorrect knowledge.
>
> Neglecting to Respond or Holding Information. The reader has no interpretation or makes an interpretation and rephrases it in a variety of variations without the addition of any new information.

In considering implications for pedagogical practice, Phillips-Riggs suggests that "the teacher should develop within his/her students' competency in the use of Most Productive strategies while helping them minimize their reliance on the use of those strategies that are Counter-

productive" (p. 192).

Logically, if the strategies used by very proficient readers in generating inferences when reading have been identified, one could attempt to develop an awareness of those strategies and give instruction to facilitate their use by average readers, who are less proficient than those worked with by Phillips-Riggs.

The research explored in this section, particularly that of Phillips-Riggs, has several implications for reading teachers and reading instruction.

1. Superior readers use particular strategies when reading.
2. It is possible to identify strategies used by means of a comparison of student text recall and introspection elicited during the reading of a passage to a detailed model of the presented text.
3. By pinpointing strategies used by superior readers, it becomes clear what strategies less skilled readers must learn to use.
4. Reading instruction should focus on developing an awareness of those strategies determined to be most productive in generating inferences and give instruction to facilitate their use.
5. Instructional programs should develop an awareness of those strategies identified as counterproductive in generating inferences and give instruction to minimize their use.

Implications of Past Research for the Present Study

The process of inference is an important element in the comprehension of and memory for text information. Accepting the premise that children's ability to spontaneously generate inferences can be altered, and having identified those strategies used by very proficient

and less proficient readers, reading programs should, through explicit instruction given within the reader-text encounter, develop an awareness of those strategies. Teachers should encourage use of strategies determined to be effective in understanding what is read and discourage use of strategies determined to be ineffective in understanding what is read. Children should also be encouraged to use their own knowledge in combination with the text information to make inferences and to give reasons for inferences made. To determine if the use of inferencing strategies has changes as a result of instruction strategies can be identified by comparing the text with student recall and introspective comments.

The literature reviewed in this chapter has strongly influenced several aspects of the present study. First and most obvious, is the identification of the research problems, which in the most general terms, ask the question, "Can instruction affect children's abilities to use inferencing strategies?" At a more specific level, the literature reviewed in this chapter provided guidelines for both the content and methodology of the instructional program, as well as procedures used to collect and analyze the data.

The previous research has also affected the data collection procedures and the steps taken to analyze the data.

Summary

This chapter reviewed literature relevant to a growing knowledge of the inference process. The literature suggests that inference is a uniquely distinguishable dimension of reading comprehension and that the generation of inferences, when reading, aids

memory and provides coherence and continuity for what has been read. The research also suggests that proficient readers use superior strategies, that strategies can be identified by comparing student recall and introspective comments with the text read during the reader-text encounter, and that reading programs should work to develop an awareness of and enhance the use of those superior strategies to aid comprehension.

The present study focused on the instruction of average readers in the inferencing strategies identified by Phillips-Riggs. The development and presentation of passages and inference questions, which formed the core of the instructional program and provided the text in the reader-text encounter, are detailed in the following chapter.

CHAPTER III

DEVELOPMENT AND PRESENTATION OF PASSAGES AND INFERENCE QUESTIONS

Introduction

To conduct this study, narrative passages and inference questions were needed to tap the inferencing strategies used by readers within the reader-text encounter (Phillips-Riggs, see p. 22, Chapter 2). The development of the narrative passages and inference questions, as well as the plan of presentation, are reported here because the passages, questions and method of presentation were the core of the instructional program and also served as major testing instruments. The guidelines used in developing the narrative passages and inference questions are described in this chapter.

Before proceeding, it should be noted that this chapter explores the development of the original narrative passages, questions and method of presentation in order to provide the reader with a comprehensive overview of the process of development involved in designing appropriate instructional and testing materials. These materials were subjected to a field-test in a pilot study (see Chapter V) and were subsequently modified prior to the study proper. Those modifications will be discussed in greater detail later in this report.

Development of the Narrative Passages

The criteria for selecting and adapting the narrative passages appropriate to the needs of this study reflect both the work of Phillips-Riggs and the present investigator. Phillips-Riggs wrote six narrative passages which required the reader to generate inferences

in order to comprehend the passages. Each narrative passage consisted of five major events, each of which provided the reader with more information from which to infer what situation was occurring. All major events in the passages progressed from general to specific features of the situation until finally, in a sixth section of the passage, the situation was explicitly stated.

Appendix A contains an example of one narrative discourse passage written by Phillips-Riggs.

The narrative passages written by Phillips-Riggs were approximately 100 words in length. This made it possible for her to control sentence type (declarative), number of syntactic structures, number of major events, and content in terms of centering each major event on the main inference to be made, i.e. the situation, and progressing from general features to more specific features of this situation. However, she suggested that passages extracted from a basal reading series would be more representative of the type of reading material children are expected to deal with in the classroom setting. In response to this suggestion, stories included in the series Starting Points, Level C, Second Reader (Ginn, 1975) were adapted for use in this study.

Several differences in criteria between Phillips-Riggs and the present investigator used to guide the development of the passages reflect the use of material drawn and adapted from a basal reading series. During the selection and adaptation of stories, this investigator determined that a length of approximately 550 words would more readily allow for the literary conventions of plot and character

development. Largely as a result of the increased length, each passage would include all sentence types, i.e. declarative, interrogative and exclamatory. Length would not be controlled in terms of the number of syntactic propositions in each passage, or the number of major events. Each passage would include several events. The passages would not progress from general features to more specific features of one situation since the basal reading selections contained recognizable short story elements including characterization, problem, goal, attempts to resolve the problem, obstacles, and a resolution of the problem.

Since Phillips-Riggs wanted to determine the effects of content familiarity on the use of different inference strategies, she also controlled for the familiarity of the passage content to the grade six Alberta students in her study. She wrote three passages which dealt with familiar situations, i.e. skiing, farming and rodeo and three passages which dealt with unfamiliar situations, i.e. randying, garden party and fishing. This was not one of the purposes of the present study and the context of all passages adapted for use in this study would be familiar to the experience of the grade six Alberta student as might be expected when basal reading selections were used.

While Phillips-Riggs did not determine the readability level of passages written for use in her study, two readability formulae would be applied to all passages adapted for use in this study, and readability level determined.

In summary, the specific guidelines for this study were:

1. The reader would be required to generate inferences in order to comprehend the passage.

2. The content of each passage would be judged experientially familiar to the grade six student, based on the investigator's ten years of experience with students at this grade level.
3. Reading level for all passages would range from Level 4 to Level 6. Level of difficulty would be assessed through the application of two readability formulae, i.e. RIX (Anderson, 1983) and The Noun Frequency Method (Elley, 1975).
4. Each passage would be approximately 550 words in length.
5. Each passage would contain declarative, interrogative and exclamatory sentence types.
6. Each passage would contain recognizable short story elements, including characterization, problem, goal, attempt to resolve the problem, obstacles, and resolution of the problem.
7. Each passage would be divided into nine episodes. Each episode would contain one or more paragraphs and allow for the inclusion of at least one major event without unnaturally fragmenting the passage as a whole.
8. Each passage would include a resolution. This would allow the student to confirm earlier predictions.

Phillips-Riggs' method of presenting the passages to the students would be followed in that each passage would be presented in booklet form with one episode, including at least one major event, on each page.

Appendix B contains one narrative discourse passage adapted for use in this study. Appendix C describes the structure of all passages adapted for use in this study.

Development of the Inference Questions

In Phillips-Riggs' study, a key inference question on the passage was asked as a part of the introduction to the passage, e.g. I want you to think about what is happening and where they are going. Additional inference questions would be developed for each episode and designed to stimulate further interpretation if the student did not freely provide information during introspection. The same inference questions would be asked of all students following the reading of each episode unless they had been answered during the introspection phase. The guideline Phillips-Riggs used to develop inference questions for each passage was that the reader, in response to the question, would be required to generate an inference. The same guideline directed the development of the inference questions used in this study. The questions in the present study would require the reader to draw conclusions, see logical relationships, make predictions, react to characterizations, and appreciate mood and feelings. The same questions would be asked of all students unless the student provided the inference information independently during introspection. Appendix B also contains the inference questions written to accompany the narrative passage recorded there.

Selection of the Pretest and Posttest Passages

Since one of the purposes of this study was to improve students' reading comprehension by altering subjects' use of inferencing strategies, it was necessary that the posttest passage be difficult enough to allow for improvement in reading comprehension and require a more knowledgeable use of inferencing strategies. This investigator

decided that the pretest passage, (The Sneaker Crisis), should be at reader level four while the posttest passage, (Elbow Grease), should be at reader level five. Both passages would involve humorous situations with which subjects in the study could identify, and the investigator expected that subjects would enjoy reading these passages. Appendix B includes the pretest passage, "The Sneaker Crisis" and the accompanying inference questions while Appendix D includes the posttest passage, "Elbow Grease" and the accompanying inference questions.

Comparing the Method of Presentation to be Used in the Present Study with that of Phillips-Riggs

While the method of passage presentation used by Phillips-Riggs guided the presentation of passages used for both testing and instruction in the present study, it was noted that Phillips-Riggs, in reporting her study, did not include a transcript presenting an actual interaction with subjects. Although each subject in her study took part in a trial run in which a sample passage was "presented and worked through" (p. 110), exactly what occurred was not made explicit. As a result, this investigator found it difficult to get a clear understanding of some of the procedures used by Phillips-Riggs and had to depend upon interpretations of Phillips-Riggs' procedures. The similarities and differences in the two methods of passage presentation are detailed in this section. Phillips-Riggs' overall method of presentation involved a combined introspection and probing approach which was also followed in the present study. Phillips-Riggs presented the first passage and gave an introduction which directed subjects' attention to a main inference which was the key to understanding the passage, e.g.

"This is a story about two people going somewhere. I want you to think about what is happening and where they are going." In the preceding example, the main inference being sought is indicated by the phrase, "where they are going". Requiring subjects to generate a main inference was not one of the focuses of the present study. Therefore, the main inference question was replaced by an introductory statement which was intended to focus subjects' attention on general story content, e.g. "This story is about a family and a problem that one person in that family has." In Phillips-Riggs' study, subjects read the first episode aloud and then introspected, i.e. told what they were thinking and why. While it was not indicated whether students in her study were asked a question after they read each episode to encourage introspection, this investigator would ask, "Tell me about what you read." Whereas Phillips-Riggs had her students read each passage aloud, students in the present study would read each passage silently. This would be done in an attempt to parallel the reader-text encounter which the reader most often experiences when reading independently. In Phillips-Riggs' study, if the subject, during introspection, did not provide information which answered both the main inference question and other corresponding inference questions, Phillips-Riggs asked the inference questions of the subjects. In this study, the investigator would also ask inference questions which had not already been answered by the subjects during introspection.

Phillips-Riggs used probe questions for two purposes. The first was to elicit from readers the reasons for inferences made and this was followed here in that students would be asked such questions

as, "Why do you think that? What makes you say that?" Phillips-Riggs' second purpose for probe questions was to clarify subjects' understanding of specialized vocabulary. Since the passages used in the present study contained general story content rather than a major event occurring in a special situation, probe questions to clarify subjects' understanding of specialized vocabulary were not needed. However, at the end of discussion of each episode, this investigator would ask, "Do you have any questions about what you read?" This would be done to maintain subjects' focus on the general story content and encourage subjects to make predictions about subsequent content. In Phillips-Riggs' study, when all the inference and probe questions had been asked for the episode, the student read the next episode. The same procedure would be followed in the present study.

The procedures to be followed in the present study during the reading of each episode are summarized here.

1. The investigator would read the title aloud.
2. The investigator would read the introductory statement aloud.
3. The student would read the first episode silently.
4. The investigator would ask, "So tell me about what you read."
5. The subjects would introspect about what had been read.
6. Inference questions would be asked where they were not answered during introspection.
7. Probe questions would be asked to encourage subjects to give reasons for their interpretations, e.g. "Why do you think that?"
8. At the end of the discussion, the investigator would ask, "Do you have any questions about what you read?"

9. At the end of the discussion and questioning, the subject would go on to read the next episode silently.

This basic procedure would be used for each episode and for all passages read during testing and would be the basic procedure used for the presentation of all passages read during instruction.

Summary

Information within this chapter detailed the development of the narrative discourse passages and the inference questions. The criteria which guided the adaptation of the passages and the inference questions were described. The general method of passage presentation to be used throughout the study was also discussed. Chapter IV describes the development of the instructional program designed to alter subjects' use of inferencing strategies. That program makes use of the passages and procedures discussed in this chapter.

CHAPTER IV

THE DEVELOPMENT OF THE INSTRUCTIONAL PROGRAM

Introduction

This chapter describes the instructional program used in this study to develop an awareness of the inference process and the strategies used by readers to engage in this process. Through instruction, the investigator attempted to increase reading comprehension by encouraging the subjects' use of inferencing strategies which would be effective in generating appropriate inferences and discouraging subjects' use of inferencing strategies which would be ineffective in generating appropriate inferences.

The development of the instructional program is presented here because the design of the study was influenced by the content, instructional format and plan of implementation of the instructional program.

Concepts which guided the development of the instructional program are described. The introductory lesson is described and the instructional format planned for all remaining lessons is presented. Information is also included on how the inferencing strategies will be defined for the grade six sample during instruction.

Before proceding, it should be noted that this chapter explores the development of the original instructional program to provide the reader with an overview of the process of development involved in designing an instructional program which would be appropriate for the purposes of the present study. This program was subjected to a field test in a pilot study (See Chapter V) and was

subsequently modified prior to the study proper. These modifications will be described in greater detail later in this report.

Concepts Which Guided the Development of the Instructional Program

The instructional program used in this study was intended to improve reading comprehension by altering the inferencing behavior of grade six readers. The content of the instructional program was defined by the investigator's consideration of several concepts which included 1) the concept of the inference process, 2) the sources of information used in generating inferences, 3) the role played by the inference process in reading comprehension, and 4) the use of inferencing strategies to enhance comprehension. Each of these concepts is explored here.

The Inferencing Process

Inference, as a process, is defined in this study as new information (not explicitly stated in the text) generated when the reader's background knowledge interacts with the printed text. The instructional program designed for use in this study intended to develop an awareness of the process of generating new information not explicitly stated in the text information.

Sources of Information Used in Inference Generation

An inference is generated when the reader's background knowledge interacts with the text information to generate new information not explicitly stated in the text. Although readers are generally aware of the importance of text information in understanding what is read, they are not always aware that their own knowledge plays a part

in making sense of what is read. The instructional program designed for use in this study intended to develop subjects' awareness of both text and their own background knowledge as sources of information used interactively to understand what is read.

Role Played by the Inference Process in Reading Comprehension

While the investigator acknowledges that the ability to derive inferences enhances children's comprehension and memory for what has been read by providing coherence and continuity for information read, a simplified explanation was more appropriate for the purposes of this study. In attempting to improve reading comprehension, the investigator decided to focus the attention of subjects on understanding the author's meaning. For the purposes of this study, reading comprehension became synonomous with understanding the authors' intended meaning which is not always stated explicitly in the text information. To comprehend what is read, it is necessary to understand the author's implied meaning and the manner in which the reader reaches this understanding is by generating inferences. The instructional program designed for use in this study intended to call subjects' attention to the author's implicit meaning.

Use of Inferencing Strategies to Enhance Reading Comprehension

In identifying strategies used by the reader to generate inferences, Phillips-Riggs determined that of ten strategies, four were effective in generating inferences while three were ineffective in generating inferences. The instructional program designed for this study intended to develop an awareness of these seven strategies, to

encourage the use of those four strategies determined to be effective in generating inferences and to discourage the use of those three strategies determined to be ineffective in generating inferences.

Simplifying the Inferencing Strategies

Phillips-Riggs identified and defined inferencing strategies by analyzing subjects' protocols given in response to narrative passages and inference questions. Each strategy was defined in terms of being understood by a knowledgeable adult reader. This investigator determined that using Phillips-Riggs' actual definitions to explain and work with the inferencing strategies during instruction would be confusing to subjects. Consequently, in designing the instructional program used in the present study, it was necessary to simplify the definitions of the most productive and least productive strategies so that those strategies could be passed along to grade six children. On analyzing Phillips-Riggs' definitions for each inferencing strategy more closely, this investigator decided that the use of each strategy could be represented by an action. In the following section, Phillips-Riggs' definitions of each of the seven inferencing strategies focused on in this study are presented followed by actions which represent this investigator's understanding of each definition, and examples which illustrate the occurrence of each action. These examples are based on the following narrative passage (Phillips-Riggs).

Skiing

Episode A: The slope was covered with people.
But there was room for lots more.

Episode B: Marty's heart pounded with excitement as he raced past the chalet to join them. He was scared a little.

Episode C: He had all new gear. He was anxious as he waited in line for the chairlift. He checked his boots and bindings.

Episode D: The run was steep and had powder snow at the top. Marty dodged and weaved every mogul without a wipeout.

Episode E: The steel edges saved him from crashing into the lineup.

Episode F: Yes, skiing is a good way to spend a winter's day.

(p. 212)

> Most Productive Strategy One (Shifting of Focus) is used when a reader cannot readily resolve a question about what he has been read. The reader then asks himself or herself other questions related to this immediate question.

This strategy requires readers to ask themselves questions about what is read. Therefore, the investigator determined that the action which represents the use of this strategy is to ask questions. An example of this action would be when a subject, on reading Episode D, says, "There was powder snow and the boy was dodging around." and then asks, "But what's a mogul?"

> Most Productive Strategy Two (Analyzing Alternatives) is used when the reader raises more than one possibility and/or holds each possibility tentatively until more information is available.

This strategy requires readers to suggest several alternatives about what is read when they aren't sure of the correct interpretation, and to think of interpretations in a tentative way until they have fur-

ther information. This investigator determined that the actions which represent the use of this strategy are 1) make several guesses and 2) be prepared to change your mind. An example of this action would be when a subject, on reading Episode A, says, "I think he's going skiing, or maybe tobogganing."

> Most Productive Strategy Three (Confirming an Immediate Prior Interpretation) is evidenced in two ways. The first is when the reader confirms a prior interpretation with information from either his or her own knowledge or the print. The second is when the reader makes an interpretation that is consistent with text information.

This strategy requires readers to make inferences that are consistent with what is read and to give reasons for inferences generated about what is read. The actions which represent the use of this strategy are 1) make sense and 2) give reasons.

Examples of these actions would be 1) when a subject on reading the phrase "waited in line for the chairlift" in Episode C says, "He's going up a mountain," and 2) when a subject on reading Episode C says, "He's skiing because he was wearing boots and bindings."

> Most Productive Strategy Four (Empathizing from Experience) is evidenced in two ways. The first is when the reader uses personal experiences to make sense of text information. The second is when the reader projects himself or herself into the actual situation described in the text.

This strategy requires readers to relate personal experiences to what is read. The action which represents the use of this strategy is to use your own experience. Examples of this action would be 1) when a subject on reading Episode F says, "He must be cold. When I was

skiing I got really cold," and 2) when a subject on reading Episode D says, "He was dodging and weaving every mogul. Oh, I'm so scared."

> Counterproductive Strategy One (Assigning an Alternate Case) is used when the reader makes an interpretation that is inconsistent with text information.

Use of this strategy requires readers to make interpretations that are not consistent with what is read. The action which represents the use of this strategy is that it doesn't make sense. An example of this action would be when the reader, on reading Episode D, says, "He's going hiking."

> Counterproductive Strategy Two (Assuming a Default Interpretation and Transforming Information) is evidenced in two ways. The first is when readers make assumptions based on erroneous information. The second is when readers misconstrue information to make it consistent with an erroneous interpretation.

Use of this strategy requires readers to 1) make inappropriate interpretations based on an incorrect understanding of what is read, and 2) change other information so that it is consistent with the inappropriate interpretation or the incorrect understanding of what is read. The investigator determined that the action which represents the use of this strategy is when readers don't make sense. Examples of this action would be 1) when the reader, on reading Episode A, reads, "There was no room for more" instead of reading "There was room for lots more." The reader then says, "The slope was full," and 2) when this same reader continues to read Episode B and says, "Marty's heart was pounding because he was disappointed that he wouldn't be able to

go skiing."

> Counterproductive Strategy Three (Neglecting to Respond or Holding Information) is used when the reader has no response at all or when the reader repeats variation of an interpretation without adding any new information.

Use of this strategy requires readers to offer no response at all or to repeat the same inference without adding any new information. The actions which would represent the use of this strategy are to 1) have no answer and 2) repeat the same information. Examples of these actions are 1) upon reading Episode A and being asked by the investigator, "What do you think they were doing?", the student says, "I don't know", and 2) upon reading Episode A, the student says, "It was a gigantic slope; the slope was huge."

The strategies and their corresponding key actions, as they will be summarized for students in the instructional program are presented below.

MP1-Shifting of Focus

:Ask questions

MP2-Analyzing Alternatives

:Make several guesses

:Be prepared to change your mind

MP3-Confirming an Immediate Prior Interpretation

:Make sense

:Give reasons

MP4-Empathizing from Experience

:Use your own experience

CP1-Assigning an Alternate Case

:Doesn't make sense

CP2-Assuming a Default Interpretation and Transforming Information

:Doesn't make sense

CP3-Neglecting to Respond or Holding Information

:Do not answer

:Repeat the same information

Overall Instructional Procedures

In the first lesson, the instructor would meet students as a group to introduce the four concepts discussed earlier, i.e. the inference process, sources of information used in inference generation, the role of the inference process in reading comprehension, and the use of inferencing strategies to enhance reading comprehension. In discussing the first three concepts, students would be made aware that they should make inferences as they read; they should use their own knowledge as well as text information to make these inferences; and that generating inferences helps to get all the information the author intended them to have. This would be done by using examples drawn from a paragraph presented by the investigator and discussing each concept in terms of this paragraph and examples. In discussing the fourth concept, the use of inferencing strategies to enhance reading comprehension, students would be made aware of the seven strategies used by readers to generate inferences. Each strategy would be discussed in terms of the actions outlined earlier in this chapter. Examples used to illustrate the use of each strategy would be drawn from the story

content of, and students' response to, the pretest passage, The Sneaker Crisis.

All subsequent lessons would involve the investigator working with an individual student. In these lessons, the investigator would assist subjects to utilize the inferencing strategies when reading the narrative discourse passages adapted for use in this study by providing feedback about the inferences made by the subject and the strategies used to make these inferences.

The Introductory Group Lesson

While it is recognized that a large part of instruction is guided by student response during a lesson, the investigator/instructor must attempt to manipulate the introductory lesson in such a manner that the four concepts are explored. The introductory lesson must be highly structured to allow the instructor to explore the four concepts discussed earlier. The narrative selection used to discuss the concepts was selected because students' response to questions about it could be highly predictable and this provided assurance that the instructor would be able to parallel as closely as possible the original lesson planned. The instructor had to be prepared for a variety of responses to all questions posed in the lesson and was prepared to deal with each, i.e. an appropriate, inappropriate or no response with comments such as, "Good answer, not quite right, let me help you here". However, having given the children the ideas to explore, the instructor would elicit direct responses from students by asking further questions in which the answer would be more obvious. The basic content of the introductory lesson is outlined here.

In increasing subjects' awareness of the process of inference, it would seem logical that the first discussion would center on the definition of the word "inference". However, since the focus of this study was not on inferences, but on the ways in which inferences are generated, the instructor began the initial lesson by asking: "Does anyone know what you do when you make an inference? Whether student responses were correct, incorrect or no response, the instructor would provide appropriate feedback, e.g. Not quite; good answer; let me help you out, and then say, "I've written a paragraph on this chart. Read the paragraph silently and then I'll ask you a question about what you read." The content of the paragraph was:

> The children put on their coats, mitts, boots
> and toques. Then they got out their toboggans
> and went to play in the snow.

After giving students time to read the paragraph, the instructor would read the paragraph aloud and ask the question, "What season is it?" Anticipating the answer, "Winter", the instructor would then ask, "Did the author tell you it was winter?" Anticipating that student response would be, "No", the instructor would continue by asking, "Then how did you know that?" It was expected that students would respond by identifying words in the passage related to winter, e.g. coats, mitts, boots, toques, toboggans, snow. Once the students were able to state what evidence there was for the season being winter, the instructor would say, "When you used all the information to figure out that it was winter, even when the author didn't actually state that in

the text information, you were making an inference."

In order to get at the sources for information used in inference generation, the instructor would begin by saying, "Basically there are two sources for the information we use when we make inferences or understand information that the author did not state in words. One is the print." The instructor would then ask, "What's the other source?" The instructor anticipated that students would not be able to respond appropriately to this question. After responding to whatever student response was given, the instructor would say, "Suppose the author had written this."

> On the chalkboard the instructor would write,
> "The children put on their harbraks and went
> to play on the froomigan."

The instructor would then ask, "Do you understand what the author wants you to understand?" The expected student response was, "No". The instructor would ask, "Why not?" It is expected that students will indicate that they don't know what the words "harbraks" and "froomigan" mean. The instructor would respond appropriately and then say, "You don't know what these words mean and it makes it difficult to understand what the author means. Would someone who didn't recognize the words snow or toque or toboggan understand that the season in winter?" The anticipated student response was, "No". The instructor would continue by asking, "So what's the other source for information we use when we're reading?" It is expected that students would have a variety of responses for this question. The instructor would respond appropriately and then say, "The other source is our knowledge. We use

both the text information and our own knowledge of our world to understand all the information the author intended us to understand whether it's written down or not."

In making students aware of the role of the inference process in reading comprehension, the instructor would continue, "When we do this, we are making inferences. One of the jobs we must do as readers is to understand everything the author intended us to understand even when he or she doesn't write it all down. If we don't make these inferences when we are reading, we will not really understand. So making inferences is important when we read."

The instructor would then move to developing an awareness of inferencing strategies by saying, "There are some important things we can do when we're reading that will help us make these inferences. There are also some important things we shouldn't do when we're reading that prevent us from understanding the author's full meaning. These right and wrong things to do are called 'strategies'. I'll briefly explain some strategies and how they work to help us or stop us from understanding what we read."

For the purposes of this study, it was not necessary that subjects know the names of the strategies. Therefore, to avoid the use of confusing vocabulary, the instructor will explain the strategies in terms of the key actions determined earlier in this chapter. Each strategy will be introduced to subjects by a number and action in the following way:

Most Productive Strategies

1. Ask questions
2. Make several guesses

 Be prepared to change your mind
3. Make sense

 Give reasons
4. Use your own experience

Counterproductive Strategies

1. Doesn't make sense
2. Doesn't make sense
3. No response

 Repeat same information

Examples used during instruction would be drawn from the content of the pretest Passage A, The Sneaker Crisis, and actual student response to the passage during the administration of this pretest. As each strategy is discussed, the instructor would write the action on the blackboard.

The instructor would begin by saying,

> The first effective strategy to use is to ask questions, not just the main question like, "What was the sneaker crisis?" but other questions that may help you solve the main question. For example, you might ask, "Who is having a problem, what problem is he having?" (1. Ask questions).

The second strategy is to think of several possible answers to questions you might have, and to realize that you don't have to make up your mind about an interpretation right away. You can decide for sure later when you have more information. For example, when you ask yourself where the sneaker is, you might think of several possibilities. It could have been under the bed, in the closet, in the bathroom, in the locker room at school. If you have a wide range of possible answers, you can narrow them down as you read. (2. Make several guesses, be prepared to change your mind.)

The third strategy is to have reasons for your ideas when reading. This will help you make sense of what you read. These reasons can come from two places. The first is the text information. The second is your own knowledge. For example, the print told you that it was the mother picking up. But your own knowledge probably was that usually it's the mother who cleans up. (3. Give reasons, using your own knowledge as well as the print. Make sense.)

The fourth strategy is to use your own experience to make sense of the print. For example, pretend you are the boy, Larry, always

losing things. Now he's in a rush and he can't find his sneaker. How would you feel? Can you understand why he was waving his arms around? Putting yourself in the character's place can help you gain a better understanding of what you read. (4. Use your own experience.)

Now we'll discuss some strategies that stop you from understanding what you read. The first is when you don't try to make sense, when you're confused, when things just don't fit. For example, would it make sense that it was someone from down the street picking everything up? (Doesn't make sense.)

The other strategy you shouldn't use is when you don't answer at all. This would be a good time to try one of the helpful strategies; for example, guess, try out several ideas, or think of how your own experience could help you to understand. (No answer.)

The instructor would now read the chart aloud as a review of the lesson and say, "In the lessons we will have together over the next few weeks, we will be working together to use more effective strategies and fewer ineffective strategies."

The Remaining Individual Lessons

Fagan (Class Notes, 1982) outlined an approach for concept development in reading and suggested that use of this approach as a basic instructional format would provide an effective tool for planning reading instruction. The basic format included introducing the concept, applying the concept in a reading situation, discussing the readers' understanding of the concept, reviewing the concept, and transferring the application of the concept to other reading situations.

The instructional format used in the present study to plan the remaining eight lessons is based on the approach to concept development outlined by Fagan, and is described below in terms of the concepts being developed in these lessons. In each lesson the instructor would focus the subjects' attention on one of the four Most Productive strategies. The instructor would talk with subjects about their response to the narrative passage presented in the lesson, in terms of the subjects' use of the focal strategy when reading the passage. In each lesson, the subjects' use of Counterproductive strategies would be discussed in general terms, e.g. "You're using a strategy that stops you from making sense of what you are reading." The instructional format adapted for use in this study is described below.

Review of Concept: Review of the focal strategy and appropriate examples.

The student and the instructor would discuss the behavior used in applying the focal strategy and how this strategy functions to help understand what is read.

Application: Introduction of new passage, silent reading of the first episode, introspection.

The instructor would encourage subjects to ask questions based on the title and introductory sentence and to keep these initial questions in mind when reading the passage. Subjects would also be encouraged to predict what might happen throughout the following episodes. Subjects would read each episode silently. On completion of the reading, the subjects would be asked to introspect about what had been read in response to the instructor's question, "Tell me about what you read." As the subjects introspected, the instructor would note both the appropriate and inappropriate use of the focal strategy. Following the subjects' introspective comments, the investigator would ask subjects to give reasons for inferences generated. The instructor would then ask subjects how the use of the focal strategy helped them in generating these inferences.

Discussion, Questioning and Feedback: Discussion of use of the focal strategy and inferences generated.

Inferences which were inconsistent with text information would be identified by the instructor who would then discuss with the subjects why the inference was inconsistent and how the use of the focal strategy might be used to avoid this in future reading. Where an inference question remained unanswered, the instructor would pose the question and a similar discussion of the inference generated in terms of the focal strategy would follows.

Review of Concept: General review of the use of the focal strategy.

Transfer of Concept Application: The student would be encouraged to use this Most Productive strategy in other reading situations outside the instructional setting.

The investigator recognizes that differences in lessons between subjects will occur because of individual differences in processing the print. However, the investigator would attempt to maintain a standard instructional procedure for all students.

Plans for Implementation of the Instructional Program

The introductory lesson was to be exactly the same for all students. It would not be necessary for the investigator to respond with pupils on an individual basis, nor would individual response affect the content of the lesson in any major way. Also, time would be very limited. For these reasons, the introductory lesson would be conducted on a group basis. For the remaining eight lessons, it was expected that the content of lessons would be largely defined by individual subject response and use of strategies. In attempting to alter inferencing behavior it was necessary for the investigator to determine the strategies being used by each subject. Knowledge of strategies would be based on free recall, introspection and response to probe and inference questions given by the subject while reading the narrative discourse passages adapted for use in this study. Therefore, all succeeding lessons would be conducted on an individual basis.

The investigator would meet with each student twice weekly over a period of four weeks for a total of eight individual sessions. These lessons would be approximately twenty-five minutes in length. The sequence of experiences within lessons would be as similar for all students as possible.

Summary

This chapter detailed plans for the development and implementation of the instructional program. The concepts which guided the development of the instructional program have been described. The treatment of inferencing strategies during instruction were detailed. The instructional format designed for use in all lessons was presented. Chapter V will describe the pilot study used to test the passages and inference questions to be used during instruction and the instructional program itself.

CHAPTER V

THE PILOT INVESTIGATION

Introduction

This chapter describes the pilot investigation used to test the design and presentation of the narrative passages and the methodology and implementation of the instructional program used in the study proper.

Changes made in the narrative passages, method of presentation and instructional content and format as a result of information gained during the pilot investigation are described in this chapter. Other unanticipated information concerning selection criteria and pretest and posttest passages gained during the pilot study is also reported.

Purposes of the Pilot Study

The purposes for the pilot study to test the design and presentation of materials and the methodology and implementation of the instructional program were as follows:

1. To refine the content of the pretest, posttest and instructional passages and related inference questions.
2. To refine the probe questions.
3. To determine the appropriateness of passage length and difficulty level.
4. To determine the appropriateness of the method of presentation of passages which involved an interrupted reading pattern to allow for introspective comments and response to inference and probe questions.

5. To refine the methodology and implementation of an instructional program designed to alter subjects' inferencing behavior.

Selection of the Pilot Sample

The criteria which were intended to be used in selecting the sample for the study proper were used to select the pilot sample: non-verbal IQ scores; average reading comprehension scores, mature English speakers with no speech, hearing, sight or emotional problems. Therefore, four grade six students from one public school not involved in the main study were selected as the pilot sample. These students, two boys and two girls, had non-verbal IQ scores which fell between the 90th to the 110th percentile; reading comprehension scores on the Elementary Reading Test (Edmonton Public Schools, 1974) ranging from the 35th to the 70th percentile; were English speaking with no evident speech, hearing, sight or emotional problems.

Instruments Used

The investigator used five of the seven narrative passages developed for use in the study proper. All those narrative passages were developed in accordance with the guidelines established by the investigator and described earlier in this report (See Chapter III, p. 38). Briefly, each passage required the reader to generate inferences to comprehend the passages; was judged to be familiar to the experiences of the grade six student; was approximately 550 words in length; ranged from reader level four through reader level six; contained declarative, interrogative and exclamatory sentence types; contained recognizable short story elements; was divided into nine

episodes with each episode containing one or more major events; and was presented in booklet form with one episode on each of nine pages.

The investigator had developed several questions for each episode which necessitated the generation of inferences as well as several probe questions which required subjects to introspect, to give reasons for inferences generated and to focus on the general story content. Examples of the original questions are included in Figure 1. Changes to these questions, resulting from the pilot investigation, are reported later.

Procedures Used to Conduct the Pilot Investigation

The investigator initially met with each student individually to administer the pretest passage A, The Sneaker Crisis (Appendix B). Students were met as a group for the introductory lesson in which several concepts related to the inference process were discussed and a brief overview of Most Productive and Counterproductive strategies was given (See Chapter IV, p. 54). Following the introductory lesson, three individual lessons, each approximately 25 minutes in length, were conducted. During individual instruction the investigator attempted to increase the subjects' use of Most Productive strategies and decrease use of Counterproductive strategies by discussing their response to the narrative passages read during the instructional sessions (See Chapter IV, p. 61). The investigator concluded the pilot study with the administration of the posttest Passage B, Elbow Grease (Appendix D). Subjects' responses to both pretest and posttest Passages A and B were taped and later transcribed.

FIGURE 1

Inference and Probe Questions, Purposes and Examples

Kind of Question	Purpose	Examples
Inference	To encourage student to generate inferences	"Why were Sally and Barry in their glory?"
Probe	To require student to give reasons for inferences made	"Why do you say that?" "What makes you think that?"
Probe	To require student to introspect about what was read	"Tell me about what you read."
Probe	To redirect students' focus on story content	"Do you have any questions about what you read?"

Pilot Study Findings and Decisions Made on the Basis of the Findings

On the basis of the pilot study findings, several modifications were made. The findings and subsequent modifications are reported here.

Findings Affecting the Narrative Discourse Passages: Pretest, Posttest and Instructional

In the pretest passage A, The Sneaker Crisis, all pilot subjects had difficulty identifying when the mother was speaking. Modifications clarifying this were made. Where the original passage referred to the mother by using the pronouns "she" and "her", several of these pronouns were replaced with the word "Mother". For example, the sentence, " 'Are you sure you looked under the bed?' she asked" was modified to read, " 'Are you sure you looked under the bed?' Mother asked."

In using the posttest passage B, Elbow Grease, it was found that it did not have a resolution in that the phrase "elbow grease" was never explicitly explained. This meant that subjects were unable to confirm their predictions about its meaning. The passage was modified to make the resolution explicit by including an additional paragraph in which the father explained the meaning of the phrase "elbow grease" to the boy.

Three of the eight passages required for instruction were field-tested during the pilot study. These three passages were acceptable for use in the main study and no modifications were made.

A passage length of 550 words was appropriate for the length of time available as well as for facilitating understanding of character and plot.

Reader levels ranging from four through six were appropriate. Students were able to comprehend literal meaning but not always able to make the necessary inferences to fully understand the author's meaning.

Findings Affecting the Inference Questions: Pretest, Posttest and Instructional

As the pretesting progressed, it became apparent that some questions were not getting at the information being sought by the investigator. It appeared that these questions were too general. The investigator modified these questions by providing more specific information in the question. An example of this would be where the original question asked, "Explain Larry's remark, 'Just stay on the subject' "; this question was modified to read, "When Larry said, 'Just stay on the subject', why didn't he want the Mother to talk about the mess in the bathroom?"

As the posttesting progressed, it became apparent that one of the inference questions, "What is elbow grease?" could be answered without reading the passage if that information was available in the subjects' background knowledge. To compensate for this, the question was asked following the introductory statement. If the student couldn't respond at that point, then the question was asked again after the subject had read the corresponding episode. If the student responded correctly to this question following the introductory statement, it

was not included as one of the inference questions.

During individual instruction, it was not essential to ask all subjects exactly the same inference questions. This meant that if the subject didn't understand the intent of the question, the investigator could simply reword it. Therefore, all questions for passages used during individual instruction were acceptable and no modifications were made.

Findings Affecting the Probe Questions: Pretest, Posttest and Instructional

The probe question used to facilitate introspection following the reading of each episode in the pretest passage, the posttest passage and the instructional passages, i.e. "Tell me about what you read", elicited mainly text specific response. Since few students made inferences as a result of this question, an additional probe question was required. It was decided that after subjects had completed the free recall in response to the first question, the investigator would then ask, "So what do you think about what you read?"

The probe question used at the end of the discussion of an episode to redirect subjects' focus on the general story content, i.e. "Do you have any questions about what you read?" usually elicited a "No" response. Consequently, the use of one Most Productive strategy (MP1-Shifting of Focus) which is characterized by the reader asking questions about story content, was extremely limited. The original question was replaced with the question, "Are you wondering about anything that you read?" If students' response was "No", then the investigator would ask, "What do you think might happen next?"

Findings Affecting the Presentation of Passages: Pretest, Posttest and Instructional

The interrupted reading pattern used in the presentation of the passages to allow for introspection and response to inference and probe questions was acceptable. The pilot experience suggested that students were able to redirect their attention to the story events without apparent difficulty following each interruption.

Findings Affecting the Instructional Program

The introductory lesson. Conducting the introductory lesson with subjects as a group was satisfactory. From their responses, it appeared the students gained a general understanding about the inference process and the seven inferencing strategies.

The individual lessons. The basic instructional format for the eight individual lessons was described earlier in this report (See Chapter IV, p. 61). The pilot study showed that format provided consistency across lessons with each subject and allowed for flexibility in accommodating individual differences. The basic format was therefore considered appropriate for the purposes of the main study. While the format was satisfactory, specific instructional procedures followed in each lesson during the pilot investigation required some modification. First, it was difficult to focus on each inferencing strategy separately since subjects used all the Most Productive and Counterproductive strategies during each lesson. Maintaining a focus on only one strategy while losing an opportunity to discuss the others seemed to be an unsound teaching procedure in that all the Most Productive and Counterproductive strategies discussed in the introductory lesson need

to be applied, reinforced and reviewed interactively in the individual lessons. For this reason, several modifications to the instructional lessons were made which affected all areas described in the basic instructional format. To facilitate the explanation of these modifications, they are addressed here under the format headings.

1. Review of Strategies

It was clear that both Most Productive and Counterproductive strategies had to be reviewed at the beginning of each lesson. Therefore, the student would be encouraged to identify and discuss these strategies and to give examples of their use in understanding text information.

2. Application

The instructor, in introducing a new passage, would read the title and introductory statement aloud. The student would then be encouraged to pose questions related to the title and introductory statement and to predict what might happen throughout the following episodes. When the student had finished commenting on the story and making predictions, he or she would be asked to read the first episode silently. On completion of the reading, the student would be asked, "Tell me about what you read." Following the student's response to this question, the instructor would ask, "So what do you think about what you read?" During the student's free recall and introspection, the instructor would write down both appropriate and inappropriate inferences made by the student and identify the inferencing strategies used to generate the inferences. Following the introspective comments, the instructor would continue by asking probe questions requiring the

student to give reasons for making particular inferences.

3. Discussion, Questioning and Feedback

The instructor would initiate the discussion by sharing the notes made during the student's response to the previous episode and ask the student to determine which strategies were used to generate the appropriate inferences made. Inappropriate inferences which were inconsistent with text information or based on erroneous information would be pointed out to the student. The instructor would then discuss why the inference was inappropriate, what erroneous information was used and how an inappropriate inference conflicted with text information. This would be followed by a discussion about what strategies might be used to avoid this in future reading. The instructor would also discuss Counterproductive strategies and attempt to minimize their use by the student through discussion of how the conscious and deliberate use of Most Productive strategies would be an effective way of dealing with confusing interpretations. The student should try to be aware of when he or she is confused about what is being read and use Most Productive strategies to end this confusion. The student should try to ask questions, think of similar personal experiences, think of several possibilities that might make sense. The text should also be reread to make sure he or she is getting the correct information. Where an inference question remains unanswered, the instructor would ask the question and a similar discussion of the inference generated and strategies used would follow. Before going on to read the next episode, the instructor would ask, "Are you wondering anything about what you read?" If the response was

"No", the instructor would ask, "What do you think might happen next?" The instructor would discuss the importance of maintaining a focus on the story content and encourage the student to ask questions about what has been read and make predictions about what might happen next. When the student has made predictions and asked questions, the next episode would be read silently. The same procedures would be followed for each episode until the passage was completed.

5. General Review of Strategies

Once the passage was completed, the instructor would review Most Productive and Counterproductive strategies in general terms. This would be done in several ways. The instructor or the student would list the strategies on paper or review them aloud or a combination of these methods would be used.

6. Transfer Concept Application

In order to encourage the student to develop a more spontaneous use of these strategies when reading outside the instructional setting, the student would be asked to try to use Most Productive strategies when reading in the classroom or individually and to try to identify the use of Most Productive strategies by other students in the classroom setting.

Findings Affecting Other Areas of the Study

In addition to the original stated purposes for the pilot study, other decisions were made on the basis of information gained as a result of this preliminary study.

Selection Criteria. One subject participating in the pilot study appeared to have difficulty in decoding the words, and as a

result, was unable to give full attention to reading for meaning. The investigator recognized that subjects must have fairly well-developed decoding skills to enable them to focus on meaning. Therefore, an additional criteria for selection of the sample in the study proper was needed. The investigator decided that in addition to the original selection criteria, only those readers whose decoding skills were above the 35th percentile on the Elementary Reading Test (Edmonton Public Schools, 1974) should be considered for selection.

Selection of the Pretest and Posttest Passages. "The Sneaker Crisis", at reader level four, and "Elbow Grease" at reader level five, were acceptable for use as the pretest and posttest passages respectively. Pilot subjects appeared to enjoy reading these passages and the reader levels were appropriate.

Summary

This chapter described the pilot study used to test the design and presentation of narrative passages and inference questions as well as the design and implementation of the instructional program. Information gained during the pilot investigation affected the content and presentation of the narrative passages, the inference and probe questions, and the concepts and procedures used during instruction. Changes made in the design of passages and instruction, as a result of information gained during the pilot investigation, have been described. Other decisions made, as a result of the pilot study, were also detailed. Chapter VI describes the design of the main investigation.

CHAPTER VI

DESIGN OF THE STUDY

Introduction

This chapter details the design of the study. The criteria used in selecting the sample are described. The method of sample selection is discussed and a description of the final sample is included. Information is presented on the testing instruments used in the investigation and the administration of the pre and posttests. Overall procedures used to conduct the study are outlined. The instructional program is described and the data collection and instructional schedule is presented. Changes to the original research design that resulted from knowledge gained during the pilot investigation are incorporated in descriptions of the study proper.

Selection of the Sample

The principal purpose of the present study was to determine if an instructional program based on seven of Phillips-Riggs' (1981) ten inferencing strategies would be effective in altering average grade six students' use of inferencing strategies, and whether the instructional program would increase reading comprehension as measured by one reading comprehension test. To achieve these purposes, only those students who met the criteria described in the following section were selected to participate.

Description of the Selection Criteria

Non-Verbal Intelligence

In an attempt to control for subjects at the extreme ends of the scale in intellectual ability, all students selected to participate in the study were to fall within the average range of non-verbal intelligence, i.e. from the 90th to the 114th percentile, as assessed by the Canadian Cognitive Abilities Test administered by the Edmonton Public School system. The non-verbal component was chosen as an indicator of general ability least likely to be affected by reading ability.

Reading Comprehension Ability

All students selected to participate in the study were to fall within the average range of reading ability in comprehension as determined by scores on the Elementary Reading Test (Edmonton Public Schools, 1974) administered by the Edmonton Public School Board (EPSB). Phillips-Riggs (1981) determined that the average reader fell within a range of the 50th to the 80th percentile in vocabulary and comprehension on the Canadian Test of Basic Skills (King et al., 1977). While the EPSB does not suggest norms for this test, this investigator's experience with the Elementary Reading Test suggested that a range of the 35th to the 70th percentile was appropriate in determining an average reader. Thus the range to be used, in identifying the average reader, was to be from the 35th to the 70th percentile in reading comprehension.

Reading Decoding Ability

Because the focus of this study was on getting meaning, it was important that all subjects were at least average decoders. This would enable each reader to direct attention to meaning rather than decoding. For this reason, only those students whose decoding scores, as determined by the Elementary Reading Test, were above the 35th percentile were to be considered in the selection of the sample.

Teacher Assessment

All subjects selected to participate in the study were to be identified as average readers by their classroom teachers. This was to be a subjective evaluation based on the teachers' knowledge of subjects in the classroom setting.

Other Factors

1. All students included in the sample selection were to be English speaking and not involved in any language immersion program.

2. All students included in the sample selection were to have no evident sight, hearing, speech or emotional problems.

Method of Sample Selection

The sample was drawn from the 58 students in two grade six classrooms from one Edmonton Public School. The specific steps taken to select the sample are described below.

Non-Verbal Intelligence

The average range originally included by the investigator was between the 90th and the 110th percentile. However, only fourteen

students fell within this range. In attempting to include a greater number of subjects in the sample, the investigator adjusted the average range to include those students who fell between the 90th and the 114th percentile. Nineteen students met this criterion.

Reading Comprehension Ability

The range used in identifying the average reader was from the 35th to the 70th percentile in reading comprehension. All nineteen students met this criterion in that they scored between the 35th and the 70th percentile in reading comprehension on the EPSB reading test.

Reading Decoding Ability

Only those students whose decoding scores were above the 35th percentile were included in the sample. Eighteen of the nineteen students who met the non-verbal intelligence and reading comprehension criteria met this criterion.

Teacher Assessment

The classroom teachers subjectively identified students as average readers. A list of subjects who met the non-verbal intelligence, reading comprehension and reading decoding criteria was given to the two classroom teachers. Each teacher was asked to identify students on the list whom they judged to be other than average readers. Two students were identified by classroom teachers as proficient rather than average readers and eliminated from the sample.

Other Factors

All sixteen students were English speaking, not involved in any language immersion program, and had no evident sight, hearing, speech or emotional problems.

Eight boys and eight girls met the selection criteria for a total of sixteen subjects.

Assignment of Subjects to Experimental and Control Groups

While sex was not one of the original criteria for selecting the sample, when the group consisted of eight boys and eight girls, it was decided to balance the groups by randomly selecting four of the eight girls for the experimental group and four of the eight girls for the control group. This same procedure was followed with the boys. Thus both experimental and control groups consisted of four boys and four girls. However, near the conclusion of the study, one female subject was unavailable for assessment, and was eliminated from the sample. The final sample was comprised of four boys and four girls in the experimental group and four boys and three girls in the control group for a total of fifteen subjects.

Statistical Description of the Sample

Table 1 compares the non-verbal intelligence, decoding and reading comprehension scores for the experimental group of eight subjects and the control group of seven subjects. The investigator determined that there was a difference in mean non-verbal intelligence scores of 4.75 percentiles favoring the control group. Therefore, a series of t-tests were computed to establish whether the differences

TABLE 1

Mean Scores for Non-Verbal IQ, Decoding and Comprehension for Experimental and Control Groups

Group	Non-Verbal IQ Range	Non-Verbal IQ Mean	Decoding Percentile Range	Decoding Percentile Mean	Comprehension Percentile Range	Comprehension Percentile Mean
Experimental	90-108	103.25	37-77	54.75	35-68	53.5
Control	101-114	109.0	37-77	56.42	39.71	55.14

between the groups were statistically significant. Table 2 shows the results of that analysis. The analysis revealed that differences in non-verbal IQ between groups were not statistically significant.

The investigator recognized that the mean difference in decoding between groups was 1.67 percentiles favoring the control group, and the mean difference in comprehension between groups was 1.64 percentiles favoring the control group. Statistical tests for significance of these differences were not carried out, primarily because the control group was favored by these results.

Testing Instruments Used in the Study

Several testing instruments were used during the course of the study. There were two major purposes in using the testing instruments described in this section. The first purpose was to determine the subjects' reading comprehension ability before and after instruction. The New Developmental Reading Test (Bond, Balow, Hoyt, 1968) Forms A and B were used as a measure of reading comprehension ability. The second purpose was to identify the inferencing strategies used by subjects before and after instruction. The materials used for this purpose were two of seven passages of narrative discourse drawn and adapted from stories in basal reading series and accompanied by corresponding inference questions. These passages and inference questions were used to pinpoint the inferencing strategies used by subjects. Each instrument is described below.

The New Developmental Reading Test

The comprehension component of the New Developmental Reading

TABLE 2

2-tail Test of Non-Verbal IQ Scores Between Groups

Variable	Number of Cases	Mean	St. Dev.	St. Error	F Value	2-tail Prob.	Pooled Variance Estimate			Separate Variance Estimate		
							T	Degrees of Freedom	2-tail Prob.	T	Degrees of Freedom	2-tail Prob.
Group 1 Control	7	109.00	5.416	2.047	1.20	0.844	1.95	13	0.073	1.96	12.96	0.071
Group 2 Experimental	8	103.25	5.922	2.094								

Test, Intermediate Level (Bond, Balow, Hoyt, 1968) Forms A and B were used as a measure of comprehension for the following reasons:

1. The investigator was familiar with the content, method of administration, and scoring procedures.
2. The treatment of literal and inferential comprehension as separate components of comprehension was appropriate for the purposes of this study.
3. Reliability and validity of each component as well as the test as a whole were established.
4. There were two forms, A and B, which was appropriate for the purposes of the study.

The comprehension component consisted of four parts, Reading for Information, Reading for Relationships, Reading for Interpretation and Reading for Appreciation. The comprehension component of Form A was used as a pretest while the comprehension component of Form B was used as a posttest. Each component consisted of thirty questions. The combined score on Parts II and III yields a measure of the student's ability to comprehend the literal content of the paragraphs on the test, i.e. the explicitly stated facts and relationships. The combined scores on Parts IV and V provide a score reflecting the student's ability to comprehend implicitly stated information and relationships, i.e. the ability to draw conclusions, make predictions, judge critically, react to characterizations, appreciate sensory impressions, mood, and feeling tones, and visualize settings. General comprehension is measured by combining all scores from Parts II, III, IV and V (both literal and creative comprehension scores) to indicate the student's overall read-

ing comprehension ability.

Although both forms were multiple choice in nature, a correction for guessing formula is applied so the test results more accurately reflect a student's achievement. That formula is the number of correct answers minus one-third of the number of wrong answers. The assumption is that wrong answers reflect guessing and that one of every four guessed items will be correct. Frederick Davis (Seventh Mental Measurement Yearbook) in evaluating this test stated, "The data pertaining to reliability and accuracy of measurement given in the manual indicates that the tests are satisfactory in these respects" (p. 1092).

Traxler (Seventh Mental Measurements Yearbook), a second reviewer, stated that "the standardization and statistical work on the test scores bears the mark of the professional in test construction and use" (p. 1092) and that although there is vague information concerning the comparability of the norm groups for the alternate forms of the test, he would recommend it for "cautious use in analyzing reading abilities of individual pupils in the...intermediate grades" (p. 1093).

The Narrative Discourse Passages

Of the seven passages adapted by this investigator, one (The Sneaker Crisis) was chosen as the pretest Passage A, and one (Elbow Grease) was chosen as the posttest Passage B. However, at the end of the instruction period, just after beginning the administration of Passage B, Elbow Grease, it was discovered that, although each classroom teacher had been asked to avoid working with the story from which this final passage was adapted, some students had been asked to read the

story during a reading class just prior to the final testing session. Given this situation and the timing of the administration (end of school term) the investigator had to immediately adapt an additional posttest passage from an alternate basal reading series, i.e. Gage Strategies for Language Arts 3, How Many Miles, Level 6 (Gage, 1974). This passage was developed according to the same guidelines as those used for the original six passages. This passage, referred to here as Passage C, The Conjuror's Revenge, and its corresponding inference questions were then used as a posttest passage and administered to all subjects in the experimental and control groups.

The number of questions ranged from thirteen in Passage A, The Sneaker Crisis, to eighteen in Passage C, The Conjuror's Revenge.

While the original posttest Passage B, Elbow Grease, was at reader level five, the passage used for the posttest Passage C, The Conjuror's Revenge, was at reader level six. Because the time available to develop an alternate passage was extremely limited, the investigator decided that this passage at reader level six would be appropriate for use as a posttest.

Therefore, the pretest Passage A, The Sneaker Crisis, was at reader level four, while the posttest Passage C, The Conjuror's Revenge, was at reader level six, as determined by application of the two readability formulae selected for use in this study.

Appendix B includes a copy of Passage A and the corresponding inference questions. Appendix E includes a copy of Passage C and the corresponding inference questions. Appendix F describes the content of Passage A and Passage C.

Administration of the Test Passages A (The Sneaker Crisis) and C (The Conjuror's Revenge)

The sequence of experiences with each test passage, A and C, was the same for all students. Each student was given directions about what they were to do.

> Each story is written on several pages. Read each page silently. At the end of each page, I want you to stop and tell me what you read. You don't have to tell me the exact words that you read, but only the idea of it. I may have questions to ask you after you've finished telling me about each part of the story. After we've finished discussing the part of the story you read so far, you go on to read the next page silently. Do you have any questions about what you are to do? Do you understand what you are going to tell me when you've finished reading each part?

The investigator then read aloud the title and the introductory statement.

The student read the first episode of the story silently. When the student had completed reading the episode, the investigator asked, "Tell me about what you read." Following free recall of the episode read, the investigator encouraged the student to introspect about what had been read by asking, "So what do you think about what

you read?"

The investigator frequently required the student to give reasons for an interpretation by asking, "What makes you think that?" and "Why do you think that?" Inference questions which remained unanswered were then asked and again the student was required to give reasons for interpretations made. At the end of the discussion the investigator asked, "Are you wondering about anything that you read?" If the student's response was "No", the investigator asked, "What do you think might happen next?" When neither the investigator nor the student had any further comments or questions, the student read the next episode, following the same procedures as in the initial episode until the passage was completed.

While interactions between the investigator and each student were determined by student response to some extent, and therefore varied to some degree, the investigator attempted to keep interactions with all subjects as consistent as possible.

The pretest and posttest sessions with each student were tape-recorded and later transcribed.

Overall Procedures Used to Conduct the Study

Once the sample of fifteen students was identified, the investigator met with students individually to briefly explain the purpose of the study and to determine the willingness of each subject to participate in the study. This was done in the following manner.

> I have been doing a lot of work at the University this past year in the area of Reading. I am now

> doing a study to find out more information about how people read. I'm talking with you because in looking through your records, I have discovered that you are a student who knows many things about reading. You should know that you are not here because you are a poor reader. Before going any farther, I need to know if you are willing to work with me.

All students expressed a willingness to participate in the study.

Following an agreement to participate, the investigator administered pretest Passage A, The Sneaker Crisis, individually to all students in the experimental and control groups. Following this, the New Developmental Reading Test, Form A (Bond, Balow & Hoyt, 1968) was administered, as a group test, to all students in the experimental and control groups.

The experimental group was involved in an instructional program over a period of four weeks, while the control group remained in the regular classroom in which reading instruction was based on the basal reading series, Starting Points (Ginn, 1975). Only those subjects in the experimental group received strategy instruction. This represented the only difference in treatment between the experimental and control groups. The investigator attempted to assist subjects in increasing their use of Most Productive strategies and decreasing their use of Counterproductive strategies by reviewing, discussing, questioning and providing feedback about strategies used by subjects when reading passages of narrative discourse.

Following the instructional period, The New Developmental

Reading Test, Form B, was administered to all students comprising the sample on a group basis. The investigator then administered the post-test Passage C, The Conjuror's Revenge, individually to all students comprising the sample.

All testing and instruction was done by the investigator, a teacher with ten years of classroom experience with students at this grade level.

The Introductory Group Lesson

The introductory lesson was conducted on a group basis and included all students comprising the experimental group. During this initial lesson the investigator discussed four concepts involved in making inferences to understand what is read, i.e. the process of inference, sources of information used in generating inferences, and the role played by the inference process in reading comprehension. Examples used to develop each concept were based on a paragraph presented by the investigator. In discussing the fourth concept, the use of inferencing strategies to enhance comprehension, students were introduced to Most Productive and Counterproductive strategies used by readers to make inferences. Examples used to illustrate the use of each strategy were drawn from subjects' responses during the administration of pretest Passage A, The Sneaker Crisis, administered to each subject prior to the introductory lesson. The introductory lesson is presented in Appendix G.

The Remaining Individual Lessons

The investigator met with each student individually in an empty classroom twice weekly. During the first individual lesson the

investigator realized that it was impossible to discuss all strategies interactively and complete the whole passage in the 25 minute period. Each passage was dealt with over two lessons, occurring during the same school week.

The sequence of experiences within and across lessons was the same for all students. Each lesson began with a review of Most Productive and Counterproductive strategies. Usually the student was asked to outline the behavior used in applying the Most Productive strategies. A general discussion of how these strategies functioned interactively to help the reader to understand the text information followed. The student was then given either a brief introduction to a passage to provide an initial focus for reading or given a brief review of the episodes in a passage begun during the previous lesson. The student was encouraged to ask questions based on the title and introductory sentence, and encouraged to keep these initial questions in mind as he read through each episode. Each passage was read and discussed over a period of two instructional sessions occurring within one school week, Monday through Friday. All instructional sessions occurred in the morning to accommodate school scheduling.

The overall instructional procedures used in each lesson are described below in relation to the basic instructional format used in planning each lesson.

1. Review of Strategies. Both Most Productive and Counterproductive strategies were reviewed at the beginning of each lesson. This was done in several ways. On some occasions, the investigator reviewed the strategies aloud or wrote them down on paper for the

student. At other times the student reviewed the strategies aloud while the investigator recorded them on paper.

2. Application: The investigator read the title and the introductory statement aloud to present each new passage. The student was then encouraged to pose questions related to the title and introduction and to predict what might happen throughout the following episodes. The student read each episode silently. On completion of the reading, the investigator asked, "So tell me about what you read." After the student gave free recall about what had been read, the investigator asked, "So what do you think about what you read?" to encourage the student to introspect about what had been read. As the student gave free recall and introspected, the investigator wrote down both appropriate and inappropriate inferences made by the student and determined the inferencing strategies used to generate the inferences.

 Following the introspective comments the investigator asked the student to give reasons for inferences generated.

3. Discussion, Questioning and Feedback: Appropriate inferences made by the student during free recall and introspection were read to the student. The student was asked to identify the strategy used to make the inference. If the student couldn't identify the strategy, the investigator gave this information to the student. Inferences made by the student which were inconsistent with text information or based on erroneous information were read to the student by the investigator. The instructor discussed the Counter-productive strategies used to make these inappropriate inferences

and outlined what strategies might be used to avoid this in future reading. The investigator discussed with the student how the conscious and deliberate use of Most Productive strategies would be an affective way of dealing with confusing interpretations. In this discussion the student was encouraged to ask such questions as: What are some ideas that confuse me? Does my interpretation make sense? What are some other possible interpretations? Why would each one make sense or not make sense with the text? With my own knowledge? With my own experience? How could I use my own experience to help me understand what I read? Where an inference question remained unanswered, the instructor asked the question of the student and a similar discussion of the inference generated and strategies used followed.

4. General Review of Strategies: The instructor reviewed Most Productive and Counterproductive strategies in general terms. This was done in several ways, i.e. aloud, on paper, given by the instructor or given by the student.

5. Transfer Concept Application: Each student was encouraged to use Most Productive strategies when reading individually and to identify the use of Most Productive strategies by other students in the classroom setting. The instructor said, "Try to use these 'good' strategies when you are reading in the classroom or by yourself. Think of what strategies you are using. When you're confused, think of the effective strategies and try to use them to help you understand. Also try to identify when another student makes of either Most Productive or Counterproductive strategies." This was done

to encourage the student to develop a more spontaneous use of these strategies when reading outside the instructional setting.

The investigator attempted to maintain a standard instructional procedure for all students.

Appendix H includes a transcription of a lesson conducted with one student in the experimental group as representative of lessons conducted through the study.

Similarities and Differences in Lessons Conducted with Different Subjects

Although the planned instructional format was closely followed for the individual lessons and the investigator attempted to maintain a standard instructional procedure for all students, it was necessary to respond to students according to their individual behavior in terms of making inferences and using strategies. As a result, there were differences between lessons. Essentially the differences involved the focus on strategies, the nature of questions posed by the investigator and the inferences discussed. The following briefly illustrates differences occurring between lessons with two subjects reading the same passage and answering the same inference question. Episode 1 from the passage, "Life with Father" is used herein to illustrate differences between lessons.

> A few days after Dad bought the care, he brought each of us children up to it, one at a time, raised the hood, and told us to look inside and see if we could find the birdie in the

engine. While our backs were turned, he'd tiptoe back to the driver's seat and press down on the horn.

The inference question posed was, "Why did he call the children over one at a time?"

The following represents the discussion between the instructor (I) and Student A(A):

I: Why did he call them over one at a time?

A: Because he wanted to trick each person separately and he could have a good laugh each time.

I: How do you know that?

A: Well, that's the fun of it. It's more fun for the one who's tricking if you get to do it more times.

I: What strategy did you use to answer the question?

A: I used my own experience and knowledge.

The following represents the discussion between the instructor (I) and Student B(B):

I: Why did he call them over one at a time?

B: Because there wasn't enough room under the hood?

I: You sound confused.

B: I am.

I: Why?

B: Because that doesn't really make sense to me.

I: So what should you do to make more sense of what

you're reading?

B: I could think about the good strategies to use, and try to decide which one might help.

I: Which one do you think might help?

B: Well, first, I could try to think about other possible answers. That would be a good strategy to use.

I: What other possible answers come to mind?

B: (Pause). I know I'm not supposed to not answer, but I just don't know.

I: Have you ever had an experience similar to this?

B: No response.

I: Let me help you here. Let's go back to the story and look for some information. What is the father doind to the children?

B: He's playing a trick.

I: What about when you have a good trick to play on someone? Would you call everyone over at the same time to show them the trick?

B: No.

I: What would you do?

B: I'd just do it to one person at a time. Oh! I see. Because if you tell everyone at onece, then there's no one left to play it on, and it spoils it.

I: Right. So why did the father call them one at a time?

B: So he could have the fun of doing the trick over and over.

I: When you think of what we've just talked about, what strategy do you think we were using to help you make sense of the story?

B: My own experience.

Modifications to the Instructional Program

Changes in the design of the instructional program resulted from the implementation of the program. The present study was a teaching study and in considering the non-laboratory nature of a teaching study as opposed to a classic experimental study, the need for some modification was to be expected. The major modification was that 25 minute lessons were not long enough to deal with a 550 word narrative passage and give instruction in the use of all seven inferencing strategies. Therefore, it was decided during the first individual lesson that each passage would be dealt with over two instructional sessions rather than the one as had been planned. The investigator then selected four of the seven narrative passages adapted for use in the study. The four passages were selected on the basis of both readability level and story content. One passage was at reader level four, two passages were at reader level five and one passage was at reader level six. The content of these stores was thought, by the investigator, to be the most enjoyable to read.

The second modification was that a new posttest passage, Passage C, The Conjuror's Revenge, replaced the original posttest, Passage B, Elbow Grease. The original passage, Elbow Grease, was at

reader level five while the alternate passage, The Conjuror's Revenge, was at reader level six.

Data Collection and Instructional Schedule

May 10-May 13: Administration of the pretest Passage A, The Sneaker Crisis, on an individual basis to all subjects comprising the sample.

May 13: Administration of the New Developmental Reading Test, Form A, on a group basis to all subjects comprising the sample.

May 16: Introductory group lesson with all subjects comprising the experimental group.

May 17-June 14: Individual instructional sessions with all subjects comprising the experimental group.

June 15: Administration of the New Developmental Reading Test, Form B, on a group basis to all subjects comprising the sample.

June 16, 17, 20: Administration of the posttest Passage C, The Conjuror's Revenge, on an individual basis to all subjects comprising the sample.

Dependent, Independent and Control Variables

Dependent Variables

1. Percentage of Most Productive Inferencing Strategies. This refers to the total number of Most Productive strategies used by groups for Passage A and Passage C as compared to the grand total of inferencing strategies, i.e. Most Productive, Productive, and Counterproductive, used by groups for Passage A and Passage C.

2. Percentage of Counterproductive Inferencing Strategies. This refers to the total of Counterproductive strategies used by groups for Passage A and Passage C as compared to the grand total of inferencing strategies, i.e. Most Productive, Productive and Counterproductive, used by groups for Passage A and Passage C.
3. Level of Achievement in Reading Comprehension. This refers to the raw scores of groups for Literal, Creative and General Comprehension for The New Developmental Reading Test, Form A and Form B.

Independent Variable

The independent variable was the involvement or non-involvement in the instructional program.

Control Variables

1. Intellectual Ability. The subjects in this study fell within the average range of intellectual ability, i.e. between the 90th and 114th percentiles on the non-verbal component of the Canadian Cognitive Abilities Test. Non-verbal scores were used as they were thought to reflect overall average ability not based entirely on the subject's ability to read.
2. Reading Ability. The subjects included in the study fell within the average range of reading ability as determined by the Elementary Reading Test administered by the Edmonton Public School Board at the end of Grade 5, i.e. June 1982, and the classroom teachers' subjective evaluations. Because this study focused on reading for meaning, only those students who scored above the 35th percentile in decoding were considered for the sample selection. Because the

study involved the average reader only, those students whose comprehension scores fell within the average range, i.e. the 35th to the 70th percentile, were considered in selection of the sample.

Summary

This chapter presented information on the design of the study. Sample selection and a description of the sample were outlined. Information was presented on the testing instruments used to collect the data and the schedule and method of data collection. Overall procedures used to conduct the study were outlined. The design and implementation of the instructional program was described. Modifications in the design of the study were detailed. Chapter VII will detail the coding of the protocols and the analysis of data gathered during the study. Discussions will include the preparation of data for analysis, the identification and coding of the inferencing strategies used within the protocols, and the analysis of response to The New Developmental Reading Test. The statistical analysis of the data will also be detailed.

CHAPTER VII

CODING AND STATISTICAL ANALYSIS OF THE COLLECTED DATA

Introduction

This chapter details the coding and analysis of the data. The data collected consisted of student response to the narrative passages A and C, and to The New Developmental Reading Test, Forms A and B. A description of the preparation of the protocols for coding and analysis is given. Inference strategies are defined and the assignment of strategies to the protocols is detailed. The analysis of response to The New Developmental Reading Test, Form A and Form B, is discussed. Also included in the chapter is a description of the statistical analysis of the data.

Analysis of Response to the Narrative Passages A and C

In determining the effect of the instructional program used in this study on altering inferencing behavior, it was necessary to 1) determine the number of times each inferencing strategy was used by each group for Passage A and Passage C and 2) determine the total number of strategies used by each group for Passage A and Passage C. Inferencing strategies used by subjects were identified by analyzing the protocols, i.e. the free recall, introspective comments and response to inference and probe questions, given by subjects within each group while reading the pretest Passage A, The Sneaker Crisis, and the posttest Passage C, The Conjuror's Revenge. All student responses were tape-recorded and later transcribed.

The investigator encountered several difficulties in using

the work done by Phillips-Riggs as a model in coding the subjects' protocols in the present study. Generally, this occurred because of differences between the content and presentation of the narrative passages used by Phillips-Riggs and the content and presentation of the narrative passages used in the present study, and because of a lack of information provided by Phillips-Riggs concerning the coding of the data collected in her study. The similarities and differences in the coding of protocols between Phillips-Riggs' study and the present study are referred to throughout this chapter.

All examples used throughout this chapter to illustrate various coding procedures are based on the pretest Passage A, "The Sneaker Crisis". This passage is produced here, in its entirety, to provide the reader with a familiarity with the passage from which examples are drawn.

The Sneaker Crisis

> Day after day she went around the house picking up. She picked up shoes and toys and socks and shirts and gloves and boots and books and puzzles and pennies and pencils and stuffed animals and bones the dog had left under the living-room furniture.
>
> Everytime she picked something up, which was often, she put it down again somewhere else where it belonged better than it did where she had found it. Then sometime later when someone in the family needed it, she usually knew where it was. If she could not remember at once, the article was apt to remain lost forever.
>
> One morning Larry came to the top of the back stairs and inquired gently who had stolen his sneaker.
>
> Mother opened her mouth to answer, found her mind a blank, and closed her mouth again. Larry crashed down the stairs and into the den,

and plunked his one remaining sneaker down on the desk where she was reading the morning paper. "I have to play basketball," said Larry. "I can't play on the basketball court without sneakers. So I need--."

"Have you looked?" asked Mother. "In your room? Under your bed?"

"Yeah, sure." He thought. "It's not there though."

"Well," Mother said helplessly, "you had it last Saturday."

"I know I had it last Saturday!" said Larry.

"Wait!" Mother said, and stood at the front of the stairs and called, "Janet, have you seen Larry's sneaker?"

"No, I haven't."

"Sally, Barry," Mother called to the basement, "Has either of you seen Larry's sneaker?"

"No."

"So what am I supposed to do?" asked Larry. "Play basketball in my socks or something?"

"Are you sure you looked under your bed?" Mother asked.

"Yeah," he said scornfully. "Yeah, lady. I'm sure. Never find anything around here," he complained. "Nothing's ever where you put it. Always coming and picking up stuff and putting it away where a person can't find them." He opened his eyes wide. "Gym! I wore them Wednesday in the gym. So I had them on Wednesday."

"And on Wednesday evening Larry was going to the school dance," said Janet who had just come in.

"And you took a shower before you went to the dance," Mother said. She suddenly remembered. "I saw it! I came upstairs to have a rest after you had finally gone to the dance, and I remember the way you left the bathroom--the floor sopping, and dirty towels all over, and the soap and--."

"The sneaker!" Larry quickly interrupted. "Just stay on the subject."

"Well, it was lying just inside the door, and one wet towel was half on top of it." Mother thought. "What did I do with it?"

"Think, think," said Larry, flapping his hands with impatience.

"Sneaker, sneaker," called Sally and Barry, who were in their glory. Larry raced past mother.

"Have you got it, Sal?" he yelled. "You DID find it. Gee, thanks, kids. Where did you find it?"

"Under your bed," said Sally.

"Gosh," Larry said, pleased. "I'm going to drive to the store right now and get you kids a popsicle." Larry turned to his mother. "The other sneaker," he said. "I have to go down and get those popsicles, so let's have it."

"What?" asked Mother.

"The other sneaker. The one I gave you when I first came downstairs," said Larry.

Uncomfortable, she looked down at her empty hands. "Now, let's see," she said. "I had it just moments ago..." Her mind was a perfect blank.

Preparations of the protocols for coding and analysis involved several steps, including eliminating irrelevant data, dividing the protocols into clausal units, identifying and eliminating text specific and erroneous recall, and assigning inferencing strategies to the remaining protocols. The procedures used for each of these tasks is described below.

Eliminating Irrelevant Data

While Phillips-Riggs' protocols analysis showed that "mazes" and "repetitions" had been eliminated, she did not define these terms nor give any information about their treatment in coding the data. In the present study, the first task was to eliminate all irrelevant data, including mazes (um), interjections (Let's see, what happened next?, that's all), repetition of words (the mother..the mother), and recall

conventions (it says that, and stuff like that, and everything).

Dividing the Protocols into Clausal Units

While Phillips-Riggs used the idea unit as "the information measure which was equated with a particular inference strategy" (p. 111), this investigator found it difficult to understand the procedures used by Phillips-Riggs to identify idea units. In analyzing the one example given by Phillips-Riggs of a protocol divided into idea units, this investigator decided that dividing protocols into the clausal units defined below would closely parallel the idea units used by Phillips-Riggs. Therefore, in this study the clausal unit served as the information measure to be equated with a particular inference strategy. Secondly, the protocols were divided into clausal units because the clausal unit assisted in separating text specific recall from inferential response in subjects' free recall. It also helped to organize all inferential responses for the assignment of the inferencing strategies. For the purposes of this study, clauses were of three types, i.e. independent, subordinate, and incomplete. Definitions and several examples of each type drawn from student responses to The Sneaker Crisis are presented here.

Independent Clause. That part of a sentence which contains a subject and a predicate and makes sense when standing alone. Examples of independent clauses are:

he'll just go back to school

then his mother picks it up

so it's going to start all over again

Subordinate Clause. That part of a sentence which contains a subject and predicate but does not make sense when standing alone. Subordinate clauses may take the function of an adjective, adverb, or a noun. The underlined section in each example below identifies the subordinate clause.

He said he looked but he really didn't

it was under his bed where his mom said to look

he wants to get it before he has to go to basketball

Incomplete Clause. That part of a sentence containing a group of words which do not include both subject and predicate and may be lacking a subject, verb, object or complement, or any combination of those. The underlined section in each example below identifies the incomplete clause.

yes

city because it's hard to play basketball in the dirt

it's in the closet or under the bed

probably the sister or brother

and then she's going to find it and get real mad at him

Two other considerations affected the division of the protocols into clausal units.

1. It was possible for a clause to occur within a clause, e.g. I think he'll (somebody would have kicked it somewhere) have trouble finding it. Both clauses were identified and strategies assigned to each.

2. Examples of commonly used connectives for a series of clauses

which assisted in identifying the beginning of a new clause were "and," "or," "but," "because," "so," and "if."

Appendix I contains an example of a student protocol divided into clausal units. The independent, subordinate and incomplete clauses are not identified in the example.

Identifying Text Specific and Erroneous Recall

In response to the question, "Tell me about what you read," students produced mainly text recall, both specific, i.e. a retelling of what was read, and erroneous, i.e. in conflict with the text information. Originally, it was intended to eliminate the responses to this question. However, since students sometimes make inferences during this free recall and those inferences were to be assigned strategies, it was necessary to identify the clauses containing inferences. Also, erroneous recall frequently led to the use of a Counterproductive strategy to generate an inappropriate inference. Since erroneous recall sometimes determined which Counterproductive strategy was used, it was necessary to identify clauses containing erroneous recall. All remaining text specific recall was to be eliminated from further analysis.

Identifying Text Specific Recall. Text specific recall included information from the text in its exact form; a substitution of a lexical item which did not change the meaning of the text, e.g. "running shoes" for "sneakers", "clothes" for "socks and shirts and gloves"; or a reordering of items which did not change the meaning of the text, e.g. She went around the house picking up "bones, toys, books and puzzles" for "toys, books, puzzles and bones". Specific recall can

include whole units, e.g. He came downstairs and asked his mother where the shoe was", or partial units, e.g. He came and asked where the shoe was." In all cases, recall was considered specific to the text providing that no new information had been included in that recall. For example, "a person was going around the house picking things up" was considered specific to the text, where "the mother was going around the house picking things up" would be considered inferential in nature because the text did not explicitly state that it was the mother, and therefore this recall included new information.

Identifying Text Erroneous Recall. While Phillips-Riggs had subjects read the narrative passages aloud and corrected any reading miscues as the students read, this investigator had subjects read silently and the opportunity to correct reading miscues was unavailable. As a result, the text specific recall given by subjects in response to the first question, "Tell me about what you read" sometimes included erroneous recall, that is, recall that is conceptually wrong, confusing or in conflict with specific text information. An example of this would be where the student, in reading the sentence, "I have to go play basketball," recalls, "He had to go and play baseball." Appendix J illustrates one subject's free recall with clauses containing text recall, both specific and erroneous, and clauses containing inferences identified.

Assigning Inferencing Strategies to the Remaining Clausal Units

After identifying both text specific and text erroneous recall and eliminating text specific recall, the next task was to methodically

assign inferencing strategies to all remaining clausal units in free recall, introspective comments, and response to inference and probe questions.

In coding the inferencing strategies used by subjects in this study, several difficulties were encountered in interpreting the strategies as defined by Phillips-Riggs. Some of these difficulties reflected differences in the content of the narrative passages used in the two studies. The definition of each strategy comes directly from the work of Phillips-Riggs while the explanatory notes and modifications to the original definitions are based on this investigator's observations in attempting to apply Phillips-Riggs' strategies to the present analysis. Examples from the pilot study and the study proper, as well as prototypes developed by the investigator are included to illustrate the use of each strategy. In each example student responses which showed the use of each strategy are enclosed in parentheses.

Most Productive Strategy One (MP1-Shifting of Focus).

> When the immediate questions cannt be readily resolved, then the reader may address surrounding but related though not key questions (p. 95).

It will be recalled that Phillips-Riggs wrote each passage to present a specific "situation" (e.g. skiing), and it was the subjects' task to make a main inference identifying that "situation" by reading the passages. On the other hand, in this study each passage contained general story content and no key question was asked. For

the purposes of this study, the use of the strategy, MP1 (Shifting of Focus) was used when the student asked questions related to the passage. Use of this strategy was often characterized by "What's a ...", "I'm wondering...", "I'm not sure..."

The following examples were in response to the question, "Are you wondering anything about what you read?"

1. (Where it is right now.), i.e. the sneaker.
2. (Yeah, what's the girl's name?)
3. (How old is he?)
4. (Yeah, if the shoe is under the bed.)
5. (I'm wondering if Larry's going to remember.)
6. (How Larry will react), i.e. to the shoe being found.
7. (Who's Janet?)
8. (I'm not sure if it's in the closet)/(or under the bed.)
9. (Yeah, if the shoe is in the laundry)/(or where the shower is?)

In examples 8 and 9 above, each of the two clauses was assigned the MP1 designation.

Most Productive Strategy Two (MP2-Analyzing Alternatives).

> The reader does not close in on any one interpretation of the data. Rather more than one possibility or alternative is raised and tentatively held until more information is available (p. 96).

The MP2 strategy was used in two ways. First, the student tentatively suggested an interpretation. This was characterized by words like "maybe", "could be", "might be", "I think", "probably", and "if". Examples:

1. One shoe could be in the gym.
2. He'll probably go get them a popsicle.
3. Larry might be mad at her.
4. I guess she could be wrong too.
5. Maybe she didn't like cleaning up.
6. They're under the bed I think.
7. If it was the mother/ she could have put it somewhere.

In example 7, each clause was assigned the MP2 designation because the student suggested a separate possible interpretation within each clause, i.e. It could have been the mother, and she could have put the sneaker somewhere. Second, the student suggested more than one alternative for an interpretation. This was characterized by the word "or" and involved more than one clause. The series of clauses rather than each clause was assigned the MP2 designation. Several examples are included here.

1. It could be under his bed/or in his room.
2. The shoe's probably in the shower/or his mom put it somewhere.
3. He'll probably look in the laundry/or in the shower.
4. She might have put them in this room/or else they're still in the bathroom.

Most Productive Strategy Three (MP3-Confirming an Immediate Prior Interpretation).

> The reader interprets a subsequent response so that it is consistent with the response immediately preceding (p. 97).

Phillips-Riggs' analysis of student protocols showed that the MP3 strategy was used in two ways. First, the student confirmed or verified an immediate prior interpretation. This was often characterized by the use of the word, "because". This confirmation took the form of any one of three kinds of information:

1. recall of specific text information, e.g. It will take her a long time to find the other sneaker (because her mind was a perfect blank).
2. an inference based on the text, e.g. It will take her a long time to find the other sneaker (because she couldn't remember where it was).
3. an inference based on the student's own knowledge, e.g. It's the mother cleaning up (because usually the mother cleans up the house).

Each of these confirmations, shown in parentheses, was coded MP3. However, where the confirmation involved an identification of the student's own personal experience with that of the character or story situation, it was coded MP4, Empathizing from Experience, e.g. It's the mother cleaning up (because my mother is the one who cleans up

at our house). Several examples of this use of MP3 are presented here.

1. I think Larry's quite mad (because he can't find his sneaker).
2. They're in their glory (because they found the sneaker for Larry).
3. She was uncomfortable (because she didn't know where the shoe was).
4. It was the mother cleaning up (because they're usually doing the housework).

Second, the student made an interpretation that was consistent with text information presented thus far. Several examples are presented here.

1. (The sneaker is in his room under his bed.)
2. (He should look under his bed.)
3. (They were happy they found it.)
4. (Someone will ask for something.)
5. (He never puts his things away.)
6. (He'll drive them to the store)/(and get popsicles).
7. (He'll go to his room)/(and look under his bed.)

In examples 6 and 7, each separate clause contained an interpretation consistent with the text information presented thus far and each clause was assigned MP3.

Most Productive Strategy Four (MP4-Empathizing from Experience).

> In empathizing from experience, the reader, on the basis of the data and his own personal experience, projects himself into the actual situation and

> experiences another's condition or state which becomes a part of his interpretation (p. 100).

The MP4 strategy was used in two ways. First, the student acted out an incident from the story. This was often indicated by intonation and was identified by the investigator during the process of transcribing. Examples of this use of MP4 are presented here.

1. Cause she always...("Are you sure?").
2. Sally interrupted then/and, ("I found them, I found them.")
3. Because she had the responsibility of looking after the other sneaker/while he was looking for that sneaker/so she'd be looking down,...("Oh, oh!")
4. They found the other one/and everybody's looking at her, ("What did you do that for?")
5. He's trying to get out of trouble/by going down to the store/ like...("I told you so, it was under your bed.")

Second, the student showed evidence that he was identifying his own experiences with that of the characters or events in the story. This was often indicated by the use of personal pronouns, e.g. I, me, mine, my, our. Examples of this use of MP4 are presented here.

1. (That's what I usually do/when I can't find something/I go to my mom/and she goes, well, did you look?/and I go yeah, but not very much.)
2. (Cause I'd be nervous/if I went to my first dance too.)
3. (Because my mother is the one who cleans up after everyone.)

4. (Cause he's a boy/and boys are so messy/cause like I have friends/ and they have little boys/ and they're always messy/and they always leave stuff all over the place/and you have to watch where you step.)

In all of the examples above, the strategy MP4 was assigned to the series of clauses as a whole rather than each individual clause.

Productive Strategy One (P1-Rebinding).

> When a reader suggests or hypothesizes a possible interpretation and then immediately realizes that this interpretation conflicts with previous information, he then substitutes another intrepretation. In essence, the reader is "rebinding" the present information to a previous interpretation (p. 94).

Rebinding occurred when the student immediately substituted one interpretation for another interpretation. Use of this strategy did not involve a conflict of information explicitly stated in the text. It was often difficult to determine if a change of wording indicated the rebinding of an interpretation or a simple sorting out of words in an attempt to state an interpretation, e.g. He's going to be...he won't be able to...he'll have to go buy new shoes. It was decided by the investigator that the student must make the interpretation explicit before rebinding, and all apparent false starts were eliminated from

further analysis. Several examples of the use of this strategy are presented here.

1. (They lived in the country/no, the city.)
2. (It was the sister cleaning up/no, the mother.)
3. (The shoe is at the gym/no, I changed my mind/I still think it's under the bed.)
4. (The mother found it/the kids found it under the bed.)

In each of the above examples, the series of clauses as a whole were assigned P1 strategy designation rather than each individual clause.

Productive Strategy Two (P2-Questioning a Default Interpretation and/or Direct or Indirect Conflict).

> When the reader makes an initial interpretation of the input, this may trigger off a knowledge schema which the reader may or may not continue to maintain. However, the reader may have misinterpreted certain data and/or made incorrect assumptions based on the data available. When subsequent information is in conflict, rather than the current information or choice (rebinding), the reader questions a previous interpretation and/or accompanying assumptions (p. 95).

The P2 strategy was used when the student corrected a previous interpretation by replacing it with an alternate interpretation. For the purposes of this study, the interpretation was considered "previous" when it was made on reading an earlier episode, i.e. not the episode read immediately prior to the interpretation made. In the following examples, the first clause was taken from an earlier episode, while subsequent clauses were taken from a later episode. Those which indicated the use of P2 are enclosed in parentheses.

1. Episode 4 - It's in the gym. Episode 5 - (It isn't at the gym.)
2. Episode 2 - He looked under his bed. Episode 7 - (He couldn't have looked under his bed.)
3. Episode 7 - He'll go to the basketball game. Episode 8 - (He didn't go to the basketball game.)
4. Episode 3 - Barry and Sally are friends of the family. Episode 7 - (They're not friends of the family.)

Productive Strategy Three (P3-Confirming a Non-Immediate Prior Interpretation).

> Having made a particular interpretation, the reader then considers alternatives but on the basis of subsequent information, reverts to the earlier interpretation confirming this interpretation as his choice (p. 97).

The P3 strategy was used when the student confirmed a previous interpretation. For the purposes of this study, the interpretation was considered "previous" when it was made on reading an earlier episode, i.e. not the episode read immediately prior to the interpretation made. In each of the following examples the first clause was taken from an earlier episode while subsequent clauses were taken from later episodes of the student protocols. Those which indicated the use of P3 are enclosed in parentheses.

1. Episode 2 - The sneaker is under his bed. Episode 4 - (I was right, it was under the bed.)
2. Episode 2 - Maybe he didn't look under the bed. Episode 7 - (He didn't look under the bed.)
3. Episode 1 - I think the mother is picking up. Episode 2 - (It was the mother.)

Counterproductive Strategy One (CP1-Assigning an Alternate Case).

> When information cannot be interpreted to fit within existing data, and when subsequent information does not provide a solution, then an alternate interpretation is held in abeyance from other information as a separate thread or strand. It seems as if the reader is dichotomizing his initial schema (p. 97).

The CP1 strategy was used when the student made an interpretation which was inconsistent with the text information. Several examples of the use of this strategy are presented here.

1. The mother had to have a rest (because the kids were bugging her.) In fact the mother was tired from cleaning up all the time. This was indicated, although not explicitly, in the text.
2. The mother was uncomfortable (because she's standing so long and her legs were hurting.) In fact she was uncomfortable because she couldn't remember where the other sneaker was.
3. Larry has trouble keeping track of his things (because the other children keep taking them.) In fact, he had trouble because he never put away any of his own things.
4. They'll find the sneaker in about half an hour (because the dad is going to help them look.) In fact, the text indicated that if the mother couldn't remember right away, it might be lost forever.

Counterproductive Strategy Two (CP2-Assuming a Default Interpretation and Transforming Information).

> The reader makes a particular assumption based on incorrect knowledge. That is, the reader may lack prior knowledge associations for the data presented OR misconstrues new data presented in an attempt to confirm a previous interpretation in spite of inconsistencies (p. 99).

In Phillips-Riggs' study, this strategy was used almost exclusively to identify a subject's misunderstanding of specialized vocabulary. In the present study, the passages contained general story content rather than one specific situation characterized by specialized vocabulary. For the purposes of this study, the CP2 strategy was used in three ways. First, the student made an interpretation based on erroneous recall of text, e.g. They live in the country (because they always play baseball in the country.) In fact, it was basketball being played. Second, the student made an erroneous interpretation of text information including assignment of an inappropriate meaning to a word, e.g. (The mother hid the sneaker); (Larry was trying to encourage his mother as nicely as he could) because of the world impatense or whatever that is" for "impatience". Third, the student, in spite of inconsistencies, attempted to maintain these erroneous interpretations by misconstruing new information to be consistent with the erroneous interpretation, e.g. "The mother is uncomfortable because she can't remember where she hid the sneakers." In fact, she didn't hide the sneakers. She put them where she thought they belonged.

Counterproductive Strategy Three (CP3-Neglecting to Respond or Holding Information).

> The reader has no interpretation of the information available, which is signified by silence, the expression, "I don't know", "no", OR the reader makes an interpretation in two or more variations without the addition of any new information (p. 99).

The CP3 strategy was used when the student gave no interpretation or repeated an interpretation with no new information. Several examples of the use of this strategy are presented here.

1. (No response.)
2. (I don't know.)
3. (No.) in response to the question, "Are you wondering anything about what you read?"
4. He said he's going to get them some popsicles and now he needs the other sneaker and cause they found the sneaker (so they're going to get a popsicle, he's going to get them a popsicle.)

In example 4, the series of clauses in parentheses, rather than each individual clause, was coded CP3.

In some cases, as was illustrated in several previous examples, one strategy was used over several clausal units. Several examples for strategies with which this frequently occurred follow.

Example for MP2: In response to "Where do you think the sneaker is? the student responded, (She might have put it in his room/or else it's in the bathroom/or maybe it's at the gym.)

Example for MP3: In response to, "Do you think Larry looked under his bed?" the student replied, "Probably not really well/ (because it's usually the case/you don't look as well as a mother.)

Example for MP4: In response to, "Why does Larry have such a hard time keeping track of his things?" the student replied, ("Cause I have friends/and they have little boys/and

they're always messy/and they always leave stuff all over the place/and you have to watch where you step.")

Example for CP1: In response to, "Why was the mother uncomfortable?" the student replied, ("Because they found the other shoe/and now everybody's looking at her/and thinking.. wondering what she did that for/and Larry's going to be mad.")

Example for CP2: In response to "How long will it take to find the other sneaker, the student replied, "About one hour/ (cause I think she'll just lay down/like she did before/and start thinking of where it is.")

The clauses enclosed in parentheses for each of the above examples illustrated that one strategy may extend over more than one clausal unit to fully complete the student's thought process. The appropriate strategy was assigned to the series of clauses as a whole rather than to each individual clause.

On occasion, more than one strategy was used within one clausal unit. This most often involved MP2 used in conjunction with another strategy. Several examples follow.

MP2 used in conjunction with MP3: In response to "Where do you think the sneaker is?" the student replied, "I think the sneaker is under the bed." This response was consistent with text information but the student indicated that this interpretation was held tentatively.

MP2 used in conjunction with P2: Having stated that the sneaker was at the gym, upon reading another episode, the student replied, ("I think the sneaker's under the bed.") The student was questioning a previous interpretation while still being tentative.

MP2 used in conjunction with P3: After reading Episode 2, the student suggested that the sneaker was under the bed. Upon reading Episode 3, the student stated, "It probably IS under the bed." The student was confirming a previous interpretation that the sneaker was under the bed, but the student considered this confirmation to be tentative.

MP2 used in conjunction with CP1: In response to, "Why was the mother uncomfortable?" the student replied, "Probably because she thinks Larry is going to yell at her." Although the student held this interpretation to be tentative it was inconsistent with text information.

MP2 used in conjunction with CP2: The student stated, "I think the mother hid the sneaker to teach Larry a lesson." Although the interpretation was held tentatively by the stu-

dent, the student made an erroneous interpretation.

Appendix K contains a prototype of free recall, introspective comments and response to probe and inference questions which has been divided into clausal units to which the inferencing strategies have been assigned according to the procedures described within this section.

Appendix L contains an actual student protocol which has been divided into clausal units to which the inferencing strategies have been assigned according to the procedures described within this section.

The investigator trained a teaching colleague in interpreting and assigning inferencing strategies to the protocols. One-tenth of the protocols were analyzed by the colleague to ensure the reliability of the coding. The percentage of the inter-rater reliability in assigning inferencing strategies to the clausal units is presented in Table 3.

Number of Strategies Used

Once the inferencing strategies were assigned to the protocols, the number of inferencing strategies used by each group, i.e. experimental and control, for Passage A, The Sneaker Crisis, and for Passage C, The Conjuror's Revenge, were calculated. In the process of making inferences, subjects may have used one or more of the ten strategies described. The number of times each strategy was used was the subject's score for that particular strategy. Table 4 sets out the raw scores for each strategy used by subjects for Passage A and Passage C. For each subject, the scores for each of the Most Productive strategies were combined to produce a total score for Most Productive strategies used by each subject. Table 5 sets out the raw scores for combined Most Produc-

TABLE 3

Inter-rater Reliability for Assignment of Inferencing Strategies to Clausal Units

Analysis	Percentage of Agreement
Assignment of Inferencing Strategies to the Clausal Units	84.6

TABLE 4

Raw Scores for Strategies Used by Subjects for Passage A and Passage C

GROUP	SUBJECT	MP1	MP2	MP3	MP4	P1	P2	P3	CP1	CP2	CP3
EXPERIMENTAL	1	0/6	19/19	52/47	0/1	0/2	0/0	1/3	7/6	15/3	14/1
	2	0/0	10/12	36/41	0/0	0/1	0/0	0/1	7/9	16/8	11/1
	3	4/13	14/18	58/63	2/13	0/1	2/2	3/1	13/3	9/3	10/4
	4	0/4	13/8	37/36	0/8	0/0	2/1	0/1	8/9	6/11	8/0
	5	8/6	11/21	34/46	0/0	0/0	4/0	3/3	3/3	3/0	4/0
	6	2/7	21/14	51/46	0/0	1/0	3/0	4/6	2/2	4/6	11/1
	7	1/5	19/5	35/45	0/0	0/0	3/0	1/3	7/4	3/9	8/1
	8	10/7	9/10	27/45	1/1	2/0	0/0	3/3	7/2	7/2	5/0

The first number represents the number of strategies used in the pretest while the second number represents the number of strategies used in the posttest.

TABLE 4 (Continued)

Raw Scores for Strategies Used by Subjects for Passage A and Passage C

GROUP	SUBJECT	MP1	MP2	MP3	MP4	P1	P2	P3	CP1	CP2	CP3
CONTROL	1	5/9	29/18	54/41	2/2	0/0	1/1	2/3	6/11	30/10	2/1
	2	2/2	7/10	34/41	1/0	0/0	2/2	1/2	6/3	7/9	16/16
	3	8/11	22/15	59/53	3/3	0/0	2/0	4/2	5/6	10/1	1/5
	4	5/0	17/11	34/45	0/0	0/0	2/0	1/7	11/4	3/6	7/7
	5	2/4	17/9	37/36	2/1	0/0	2/0	2/3	3/1	3/7	7/4
	6	0/0	11/7	23/32	1/0	0/0	1/1	2/6	6/10	5/16	7/10
	7	4/9	25/37	47/39	0/1	0/2	0/1	4/3	8/8	7/19	2/14

The first number represents the number of strategies used in the pretest while the second number represents the number of strategies used in the posttest.

TABLE 5

Raw Scores for Combined Most Productive Strategies by Subject for Passage A and Passage C

GROUP	SUBJECT	PRETEST PASSAGE A	POSTTEST PASSAGE C
EXPERIMENTAL	1	71	73
	2	46	53
	3	78	107
	4	50	56
	5	53	73
	6	74	67
	7	55	55
	8	47	63
CONTROL	1	90	70
	2	44	53
	3	92	82
	4	56	56
	5	58	50
	6	35	39
	7	76	86

tive strategies used by subjects. For each subject, the scores for each of the Productive strategies were combined to produce a total score for Productive strategies used by each subject. Table 6 sets out the raw scores for combined Productive strategies used by subjects. For each subject, the scores of each of the Counterproductive strategies were combined to produce a total score for Counterproductive strategies used by each subject for Passage A and Passage C. Table 7 sets out the raw scores for combined Counterproductive strategies used by subjects.

For each group, experimental and control, the total scores for each subject comprising the group were combined to produce a group score for Total Number of Most Productive strategies for Passage A and Passage C. For each group, experimental and control, the total scores of each subject comprising the group were combined to produce a group score for the Total Number of Productive strategies for Passage A and Passage C. For each group, experimental and control, the total scores of each subject comprising the group were combined to produce a group score for Total Number of Counterproductive strategies for Passage A and Passage C. Table 8 sets out the raw group scores for Total Number of Most Productive strategies, Total Number of Productive strategies and Total Number of Counterproductive strategies and includes the grand total of all strategies, i.e. Most Productive, Productive and Counterproductive, used in Passage A and Passage C according to group.

Percentage scores were compared across groups to determine the effects of the instructional program on the use of Most Productive and Counterproductive strategies. Percentages for Total Most Productive strategies used by group in Passage A and in Passage C were determined

TABLE 6

Raw Scores for Combined Productive Strategies by Subject for Passage A and Passage C

GROUP	SUBJECT	PASSAGE A	PASSAGE C
EXPERIMENTAL	1	1	5
	2	0	2
	3	5	4
	4	2	2
	5	7	3
	6	8	6
	7	4	3
	8	5	3
CONTROL	1	3	4
	2	3	4
	3	6	2
	4	3	7
	5	4	3
	6	3	7
	7	4	6

TABLE 7

Raw Scores for Combined Counterproductive Strategies by Subject for Passage A and Passage C

GROUP	SUBJECT	PRETEST PASSAGE A	POSTTEST PASSAGE B
EXPERIMENTAL	1	36	10
	2	34	18
	3	32	10
	4	22	20
	5	10	3
	6	17	9
	7	18	14
	8	19	4
CONTROL	1	38	22
	2	29	28
	3	16	12
	4	21	17
	5	13	12
	6	18	36
	7	17	41

TABLE 8

Raw Scores for Combined Most Productive Strategies, Combined Productive Strategies and Combined Counterproductive Strategies Used by Group for Passage A and Passage C

Strategies	Experimental Group		Control Group	
	Passage A	Passage C	Passage A	Passage C
Most Productive	474	547	451	436
Productive	32	28	26	33
Counterproductive	190	88	152	168
Total	696	663	629	637

by comparing the total of Most Productive strategies with the grand total of all strategies used by group. Percentages for Total Counterproductive strategies used by group in Passage A and in Passage C were determined by comparing the total of Counterproductive strategies with the grand total of all strategies used by group. Table 9 sets out the percentage mean scores used by groups for Total Most Productive strategies and Total Counterproductive strategies.

Analysis of the New Developmental Reading Test, Form A and Form B

Subjects' responses for each form of this test were identified as correct or incorrect by a comparison with the answers provided by the manual. The number of questions answered correctly for each of four components was the subject's score for each component. Parts II and III were combined to provide a measure of literal comprehension. Parts IV and V were combined to provide a measure of inferential comprehension, and scores for all four parts were combined to provide a measure of general reading comprehension.

For each group, i.e. experimental and control, the scores of all subjects comprising the group were combined to produce a group score for number of comprehension questions answered appropriately. Group performance on pretest Form A and posttest Form B scores were compared to assess the effects of the instructional program on literal, inferential and general comprehension.

Table 10 sets out raw scores by subject of achievement in literal, creative and general comprehension before and after instruction.

TABLE 9

Percentage Mean Scores for Combined Most Productive, Combined Productive and Combined Counterproductive Strategies Used By Groups for Passage A and Passage C

Strategies	Experimental Group		Control Group	
	Passage A	Passage C	Passage A	Passage C
Most Productive	68.10	82.50	71.70	68.45
Productive	4.60	4.22	4.13	5.18
Counterproductive	27.30	13.27	24.17	26.37
Total	100.00	99.99	100.00	100.00

TABLE 10

Raw Scores by Subject of Achievement in Literal, Creative and General Comprehension Before and After Instruction

GROUP	SUBJECT	LITERAL	CREATIVE	GENERAL
EXPERIMENTAL	1	24 / 28	27 / 25	51 / 53
	2	42 / 28	18 / 24	60 / 52
	3	30 / 27	37 / 33	67 / 60
	4	34 / 20	32 / 32	66 / 52
	5	30 / 31	32 / 27	62 / 58
	6	40 / 27	31 / 33	71 / 60
	7	31 / 34	20 / 28	51 / 62
	8	30 / 27	42 / 29	72 / 56
CONTROL	1	32 / 34	33 / 25	65 / 59
	2	31 / 29	18 / 16	49 / 45
	3	43 / 20	36 / 33	79 / 53
	4	33 / 38	39 / 30	72 / 68
	5	36 / 33	43 / 42	79 / 75
	6	32 / 27	26 / 18	58 / 45
	7	42 / 39	36 / 36	78 / 75

The first number represents the score of the subject before instruction while the second number represents the score of the subject following instruction.

Table 11 sets out raw scores by group of achievement in literal, creative and general comprehension before and after instruction.

The Research Design and the Statistical Analysis

The Research Design

The fifteen students comprising the final sample were divided into two groups, experimental and control, which are represented in Figure 2. Eight students comprised the experimental group while seven students comprised the control group.

All students fell into the average range of ability on non-verbal IQ scores and reading comprehension scores.

To ensure that the intelligence level of each of the groups was comparable, a series of t-tests were computed to establish whether or not differences between the samples were statistically significant. The results revealed no statistical differences between the groups according to intellectual ability.

Although there were differences between groups according to decoding and comprehension ability, the differences favored the control group and were not subjected to a statistical analysis to determine differences.

The Statistical Analysis of the Data

The computer programs used in this study were the ANOV26 of the XDER library of programs (for Hypotheses 1a and 1b) and the Statistical Package for the Social Sciences (for Hypothesis 2). The statistical analyses were funded by the Department of Elementary Education and computer facilities were provided by the Division of Educational Re-

TABLE 11

Raw Scores by Group for Literal, Creative and

General Comprehension Before and After Instruction

GROU GROUP	LITERAL COMPREHENSION	CREATIVE COMPREHENSION	GENERAL COMPREHENSION
EXPERIMENTAL	261 / 222	239 / 231	500 / 453
CONTROL	249 / 220	231 / 200	480 / 420

The first number represents the group score before instruction while the second number represents the group score following instruction.

FIGURE 2

Illustration of Study Design

	Pretest		Posttest
Experimental Group	8	Instruction 8	8
Control Group	7	No Instruction 7	7

search Services at The University of Alberta.

Two-Way analysis of variance. Hypotheses 1a and 1b were tested using a two-way analysis of variance.

The dependent variable in the test of Hypothesis 1a was the total number of Most Productive strategies used while the independent variable was the inclusion of subjects in the instructional group. Figure 3 represents this analysis.

In the test of Hypothesis 1b, the dependent variable was the percentage of Counterproductive strategies used while the independent variable was the inclusion of subjects in the instructional group. Figure 4 represents this analysis.

FIGURE 3

Two-Way Analysis of Variance Illustration for Hypothesis 1a

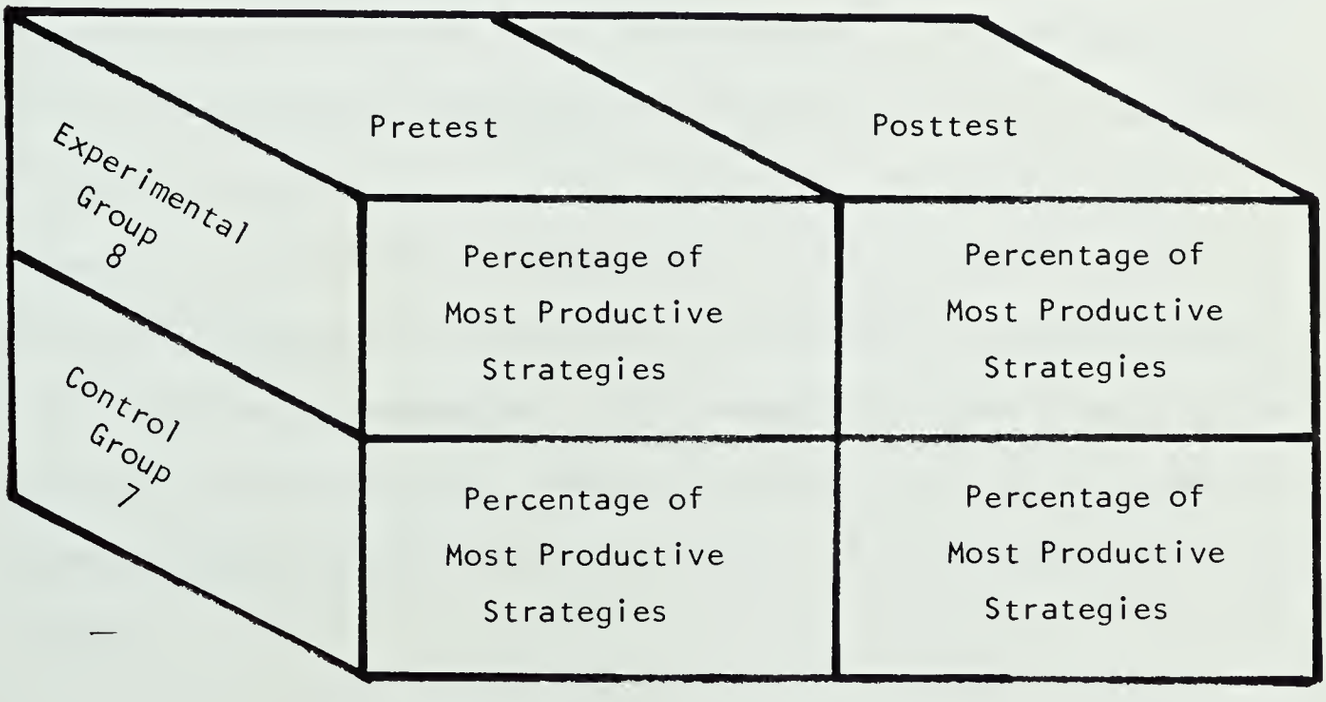
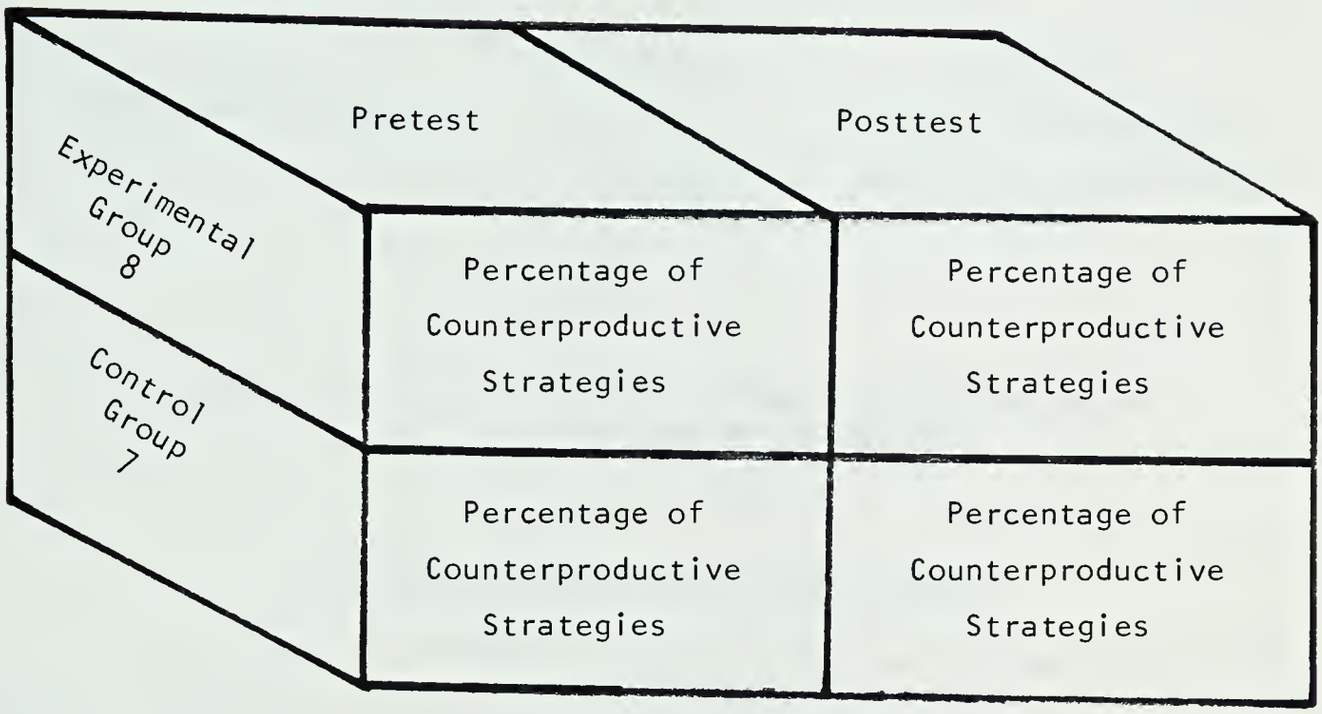


FIGURE 4

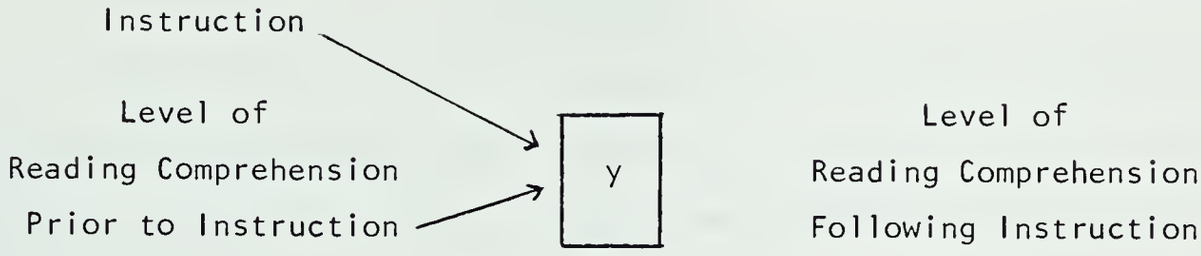
Two-Way Analysis of Variance Illustration for Hypothesis 1b



One-way analysis of covariance. Because the manual for the New Developmental Reading Test, Forms A and B, contained vague information concerning the comparability of the norm groups for the alternate forms of the test, i.e. Form A and Form B, Hypothesis 2 was tested using an analysis of covariance. The dependent variable in the test of Hypothesis 2 was level of achievement on reading comprehension following instruction. The independent variable was inclusion in the instructional group. The covariate was level of achievement in reading comprehension prior to instruction. Figure 5 represents this analysis.

FIGURE 5

Path Model of Analysis of Covariance Used to Test Hypothesis 2



y = Dependent Variable (Level of Reading Comprehension Following Instruction)

Criterion of Statistical Significance

The level of statistical significance adopted was at the .05 level. In instances where the findings are statistically significant at the .05 level, the actual levels are stated.

Summary

This chapter, on the coding and analysis of the data, discussed the preparation of the protocols for analysis and the coding of the inference strategies. Information was also presented on the statistical analysis of the data. Chapter VIII presents the findings and a discussion from the statistical analyses of Hypotheses 1 and 2 dealing with the effects of instruction on the use of inferencing strategies and reading comprehension ability as measured by one standardized reading comprehension test.

CHAPTER VIII

FINDINGS

Introduction

The findings reported in this chapter deal with the effect of involvement in the instructional program on the nature of inferencing strategies used and the level of reading comprehension achievement of grade six average readers.

This chapter includes a restatement of Hypothesis 1a, 1b and 2 as presented in Chapter I, followed by a statement of rejection or non-rejection, and accompanied by a discussion of the results.

Where appropriate, tables and figures supplement the discussion of the findings.

Effects of the Instructional Program on Nature of Strategies Used

To provide the reader with an overview prior to the presentation and discussion of each of the hypotheses, the mean scores for Most Productive strategies used before and after instruction by group are presented in Table 12 while the mean scores for Counterproductive strategies used before and after instruction by group are presented in Table 13.

Effects of the Instructional Program on Most Productive Strategies

Hypothesis 1a

That the instructional program, as set out in this study, will not be a factor in increasing the percentage of Most Productive

TABLE 12

Mean Scores for Most Productive Strategies Used in Passage A and Passage C According to Group

	Passage A	Passage C
Control Group	0.709	0.686
Experimental Group	0.684	0.820

TABLE 13

Mean Scores for Counterproductive Strategies Used in Passage A and Passage C According to Group

	Passage A	Passage C
Control Group	0.249	0.261
Experimental Group	0.267	0.137

strategies used.

The results from a two-way analysis of variance are reported in Table 14. The value obtained for the experimental/control variable was not significant at the .05 level. The F-ratios obtained for the pretest/posttest variable and for the interaction effects indicated a significant difference at the .05 level of the mean scores between the pretests and posttests ($p = 0.01466$), and a significant interaction effect at the .05 level of statistical significance ($p = 0.00167$). Therefore, the null hypothesis was rejected. The significant difference of the mean scores between pretests and posttests could be attributed to a practice effect. However, interaction effects within groups were also significant. Therefore, the instructional program, as set out in this study, was a factor in producing these significant differences. Consequently, Scheffé tests were conducted to compare pairs of means for significance. The results are reported in Table 15.

From the Scheffé tests on the means for significant effects, the following conclusions were drawn:

1. There were no significant differences between the pretest and posttest means of the control group for the percentage of Most Productive strategies.
2. There were significant differences between the pretest and posttest means of the experimental group for the percentage of Most Productive strategies.
3. There were no significant differences between pretest means of the experimental and control groups for the percentage of Most Productive strategies.

TABLE 14

Two-Way Analysis of Variance

Most Productive Strategies

Source of Variation	SS	DF	MS	F	P
Between Subjects	0.176	14			
Experimental/ Control Group	0.022	1	0.022	1.890	0.19243
Subjects Within Groups	0.154	13	0.012		
Within Subjects	0.115	15			
Pretest/Posttest	0.024	1	0.024	7.913	0.01466*
Interaction	0.047	1	0.047	15.593	0.00167*
Within Groups	0.039	13	0.003		

*Significant at .05 level

TABLE 15

Scheffé Tests on Pairs of Totals Significant Effects on Most Productive Strategies in Passage A and Passage C According to Group

	Control Pretest	Experimental Pretest	Control Posttest	Experimental Posttest
Control/Pretest	-	-	-	-
Experimental/Pretest	0.33	-	-	9.86*
Control/Posttest	0.28	-	-	9.58*
Experimental/Posttest	-	-	-	-

NOTE: Critical Value = 4.67

* $p < .05$

4. There were significant differences between the posttest means of the experimental and control groups for the percentage of Most Productive strategies.

Figure 6 contains a graphic representation of mean scores of the control and experimental group for the percentage of Most Productive strategies used in pretest Passage A and posttest Passage C.

For the experimental group, there was a significant difference between the percentage of Most Productive strategies used in the pretest Passage A given before instruction and the posttest Passage C given after instruction. For the posttest Passage C, a significant difference was found between the percentage of Most Productive strategies used by the Experimental group, who participated in an instructional program designed to alter inferencing behavior, and the control group, who did not participate in the instructional program.

Students participating in the instructional program increased the percentage of Most Productive strategies used from a mean of 68.4% (Passage A) to a mean of 82.0% (Passage C) while the mean for Most Productive strategies used by students in the control group was 70.9% for Passage A and 68.6% for Passage C. Therefore the instructional program, as set out in this study, produced statistically significant results in increasing the percentage of Most Productive strategies used by the experimental group.

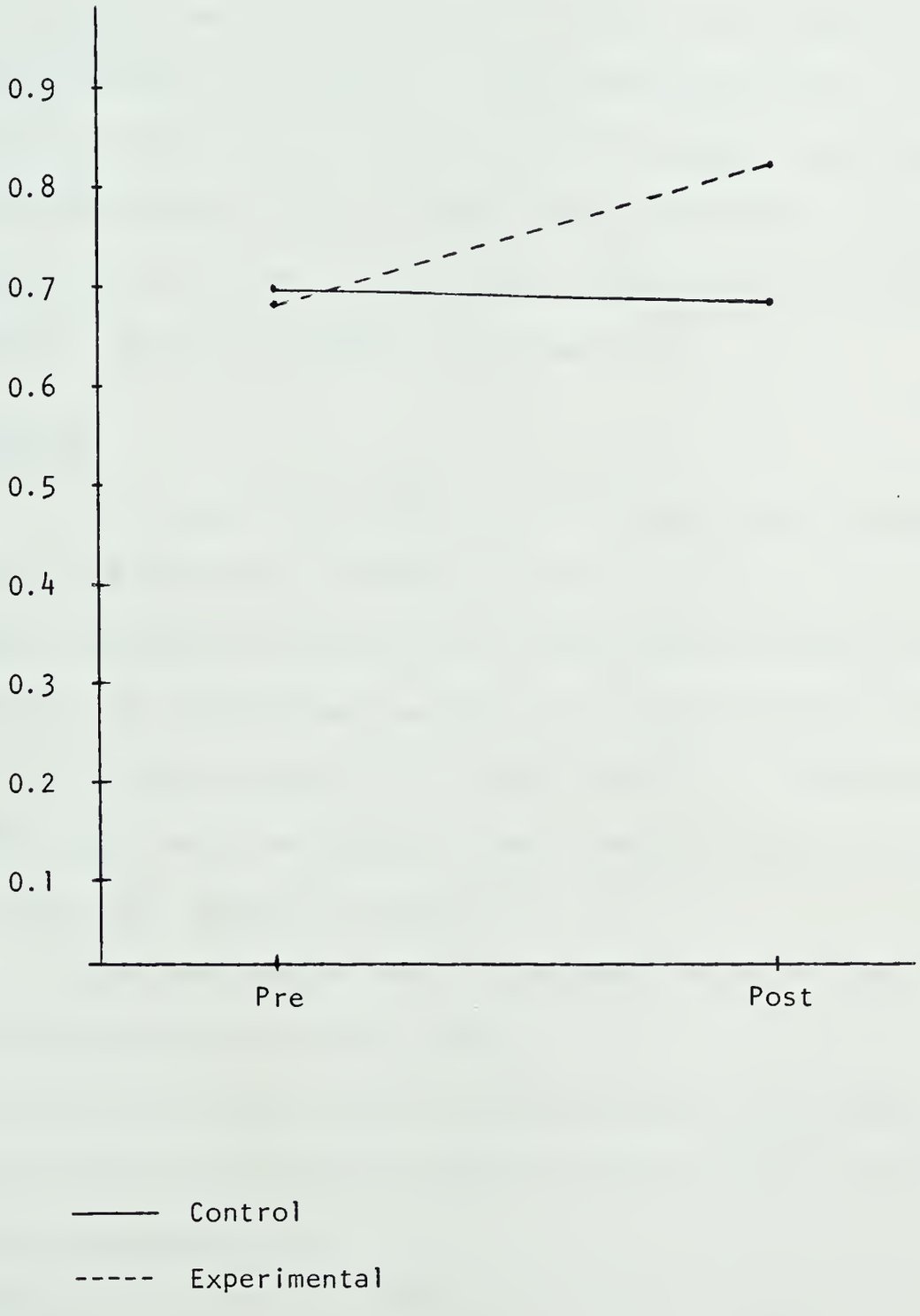
Effects of the Instructional Program on Counterproductive Strategies

Hypothesis 1b

That the instructional program, as set out in this study, will

FIGURE 6

Graphic Representation of Mean Scores for Most Productive Strategies Used in Passage A and Passage C According to Groups



not be a factor in decreasing the percentage of Counterproductive strategies used.

The results from a two-way analysis of variance are reported in Table 16. The value obtained for the experimental/control variable was not significant at the .05 level. The F-ratios obtained for the pretest/posttest variable and for the interaction effects indicated a significant difference at the .05 level of the mean scores between the pretest and posttests ($p = 0.01364$), and a significant interaction effect at the .05 level of statistical significance ($p = 0.00409$). Therefore, the null hypothesis was rejected.

Discussion

The significant difference of the mean scores between pretests and posttests could be attributed to a practice effect. However, interaction effects within groups were also significant. Therefore, the instructional program, as set out in this study, was a factor in producing these significant differences. Consequently, Scheffé tests were conducted to compare pairs of means for significance. The results are reported in Table 17.

From the Scheffé tests on the means for significant effects, the following conclusions were drawn:

1. There were no significant differences between the pretest and posttest means of the control group for the percentage of Counterproductive strategies used.
2. There were significant differences between the pretest and posttest means of the experimental group for the percentage of Counterproductive strategies.

TABLE 16

Two-Way Analysis of Variance

Counterproductive Strategies

Source of Variation	SS	DF	MS	F	P
Between Subjects	0.199	14			
Experimental/ Control Groups	0.021	1	0.021	1.497	0.24283
Subjects Within Groups	0.179	13	0.014		
Within Subjects	0.109	15			
Pretest/Posttest	0.026	1	0.026	8.127	0.01364*
Interaction	0.038	1	0.038	12.086	0.00409*
Within Groups	0.041	13	0.003		

*Significant at .05 level

TABLE 17

Scheffé Tests on Pairs of Totals Significant Effects on Counterproductive Strategies in Passage A and Passage C According to Group

	Control Pretest	Experimental Pretest	Control Posttest	Experimental Posttest
Control/Pretest	-	-	-	-
Experimental/Pretest	0.15	-	-	7.89*
Control/Posttest	0.07	-	-	7.18*
Experimental/Posttest	-	-	-	-

NOTE: Critical value = 4.67

* $p < .05$

3. There were no significant differences between pretest means of the experimental and control groups for the percentage of Counterproductive strategies used.
4. There were significant differences between posttest means of the experimental and control groups for the percentage of Counterproductive strategies used.

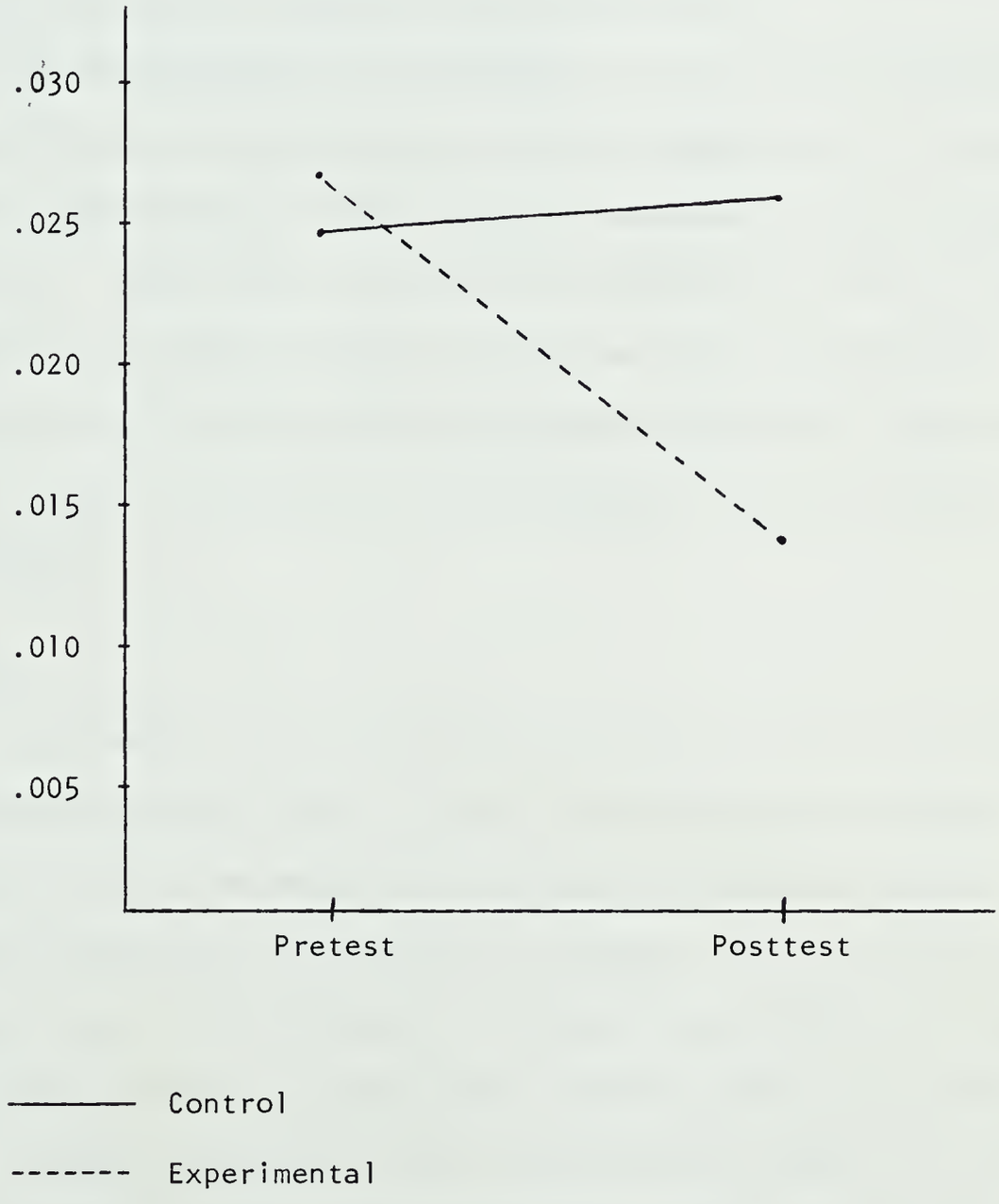
Figure 7 contains a graphic representation of mean scores of the control and experimental groups for the percentage of Counterproductive strategies used in pretest Passage A and posttest Passage C.

For the experimental group, there was a significant difference between the percentage of Counterproductive strategies used in the pretest Passage A given before instruction and the posttest Passage C given after instruction. For the posttest Passage C, a significant difference was found between the percentage of Counterproductive strategies used by the experimental group, who participated in an instructional program designed to alter inferencing behavior, and the control group who did not participate in the instructional program.

Students participating in the instructional program decreased the percentage of Counterproductive strategies used from a mean of 26.7% (Passage A) to a mean of 13.7% (Passage C). Students in the control group had a mean score for Counterproductive strategies of 24.9% for Passage A and 26.1% for Passage C. Therefore, the instructional program, as set out in this study, produced statistically significant results in decreasing the percentage of Counterproductive strategies used by the experimental group.

FIGURE 7

Graphic Representation of Mean Scores for Counterproductive Strategies Used in Passage A and Passage C According to Groups



Effects of the Instructional Program on Reading Comprehension

Hypothesis 2

That the instructional program, as set out in this study, will not be a factor in increasing reading comprehension ability as measured by the New Developmental Reading Test, Forms A and B.

The New Developmental Reading Test, Forms A and B, administered before and after instruction, included two components, i.e. Literal and Creative Comprehension, which together, comprised a general comprehension score. There were no statistical differences at the .05 level of probability for either component or for the total comprehension score before and after instruction between the experimental group and the control group. Therefore, the null hypothesis was not rejected (see Table 18).

Discussion

Involvement in the instructional program, as set out in this study, produced no statistically significant differences in reading comprehension ability as measured by the New Developmental Reading Test. The investigator expected that if students could increase the percentage of use of Most Productive strategies as a result of instruction that they would also increase their general reading comprehension ability. Although involvement in the instructional program, as set out in this study, had a statistically significant effect on increasing the percentage of use of Most Productive strategies, subjects' reading comprehension ability showed no significant increase. The absence of a statistically significant increase in reading comprehension as measured

TABLE 18

Effects of the Instructional Program on Reading Comprehension

18a. Effects of the Instructional Program on Literal Comprehension

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
Covariate	1.474	1	1.474	0.048	0.830
Literal	1.474	1	1.474	0.048	0.830
Main Effects	59.989	1	59.989	1.965	0.186
Group	59.989	1	59.989	1.965	0.186
Explained	61.463	2	30.732	1.007	0.394
Residual	366.270	12	30.522		
Total	427.733	14	30.552		

TABLE 18 (Continued)

Effects of the Instructional Program on Reading Comprehension

18b. Effects of the Instructional Program on Creative Comprehension

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
Covariate	333.043	1	333.043	14.515	0.002
Creative	333.043	1	333.043	14.515	0.002
Main Effects	18.551	1	18.551	0.808	0.386
Group	18.551	1	18.551	0.808	0.386
Explained	351.594	2	175.797	7.662	0.007
Residual	275.339	12	22.945		
Total	626.933	14	44.781		

TABLE 18 (Continued)

Effects of the Instructional Program on Reading Comprehension

18c. Effects of the Instructional Program on General Comprehension

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
Covariate	444.409	1	444.409	7.386	0.019
General	444.409	1	444.409	7.386	0.019
Main Effects	0.000	1	0.000	0.000	0.998
Group	0.000	1	0.000	0.000	0.998
Explained	444.409	2	222.205	3.693	0.056
Residual	721.990	12	60.166		
Total	1166.399	14	83.314		

by a standardized reading test parallels the findings of Hansen (1981) reported earlier in this study (see Chapter II, p. 27) in which treatment effects, i.e. strategy instruction, found to be significant within the context of the instructional setting, barely transferred to comprehension performance outside that context.

Summary of the Findings

A summary of the findings of the hypotheses is presented in Table 19. The data indicated that although the instructional program used in this study did produce statistically significant results at an alpha level of .05 in increasing the percentage of Most Productive strategies used, and in decreasing the percentage of Counterproductive strategies used, it did not produce any statistically significant results in increasing reading comprehension ability as measured by the New Development Reading Test.

Summary

This chapter reported the findings which dealt with the effect of involvement in the instructional program on the use of inferencing strategies and level of reading comprehension ability. Hypothesis 1 and 2 were restated and each was followed by a statement of rejection or non-rejection and a discussion of the results.

Chapter IX presents a review of the study and the conclusions drawn from the findings. Implications for further research and for pedagogical practice are discussed.

TABLE 19

Summary of the Findings of the Effects of the Instructional Program on the Percentage of Most Productive Strategies, the Percentage of Counterproductive Strategies, and Reading Comprehension

Null Hypothesis	Dependent Variable	Effects
1a	Percentage of Most Productive Strategies	REJ
1b	Percentage of Counterproductive Strategies	REJ
2	Reading Comprehension	NR

CHAPTER IX

CONCLUSIONS AND IMPLICATIONS

Introduction

Recent research suggests the need to teach strategies rather than skills to bring out significant changes in readers' comprehension abilities. Attempts to test this conclusion have occurred only rarely and the results have been inconclusive.

This study attempted to develop and implement an instructional program aimed at altering students' use of inferencing strategies, and to determine the effects of the instructional program on strategy use and reading comprehension.

This chapter presents a review of the study and a discussion of conclusions formulated from the findings. The implications of these findings for further research and for pedagogical practice are also discussed.

The Study in Review

Fifteen grade six students, eight boys and seven girls, all selected as average readers, were randomly assigned to one of two groups, i.e. experimental and control. Prior to the instruction, all subjects were administered The New Developmental Reading Test, Form A, as a group, and a test passage of narrative discourse (The Sneaker Crisis, Passage A) individually. Following instruction, all subjects were administered The New Developmental Reading Test, Form B, as a group, and an alternate test passage of narrative discourse (The Conjuror's Revenge, Passage C) individually. The passages used for

testing were controlled for length, content and reading level, and were accompanied by a number of inference questions to ensure that students not generating inferences spontaneously, would be required to do so. Each passage contained general story content, and was divided into nine episodes. On reading each passage silently, the student was first asked to tell what had been read and then asked to tell what he or she was thinking. The investigator asked each student to give reasons for inferences generated spontaneously and to answer any inference questions which remained unanswered for that episode. When neither the student nor the investigator had any further comments or questions, the student read the next episode, until the passage had been completed. During the administration of Passage A and Passage C, students' responses were tape-recorded and later transcribed. Subjects' protocol and test responses were analyzed both quantitatively and qualitatively with an inter-rater reliability performed on the coding of the inferencing strategies. Inferencing strategies used in the pretest and posttest responses were compared within and across groups to determine the effect of the instructional program on subjects' use of inferencing strategies. Subjects' responses to The New Developmental Reading Test, Form A and Form B, were compared within and across groups to assess the effects of the instructional program on overall reading comprehension.

The experimental group received an initial group lesson aimed at developing an awareness of the process of inference and inferencing strategies. Subsequently students met with the investigator individually over a period of four weeks. Students read narrative passages developed according to the same guidelines and presented by the same general pro-

cedures as those used for the pretest and posttest passages. The investigator attempted to increase students' use of those strategies identified as Most Productive and to minimize students' use of those strategies identified as Counterproductive in generating inferences. During each individual lesson, the process of inferencing and the use of Most Productive and Counterproductive strategies were reviewed. As the student gave free recall, introspected, and answered inference and probe questions upon reading each episode, the investigator discussed those strategies being used effectively and those strategies which could have been used more effectively. The investigator also encouraged each student to avoid the use of strategies identified as Counterproductive.

The research hypotheses pertinent to these data provided the basis for the statistical analyses. The conclusions drawn from the findings are stated in the following section.

Conclusions

This study tested three hypotheses related to the effects of an instructional program designed to alter subjects' use of inferencing strategies and consequently increase reading comprehension. While the instructional program, as set out in this study, was a factor in increasing use of Most Productive and Counterproductive strategies, it was not a factor in increasing reading comprehension. The conclusions drawn from the findings are presented here.

Conclusion 1: Most Productive Strategies

Existing research and opinions of those in the field of read-

ing suggest that students "have not developed an awareness of cognitive processes and strategies and that remediation should focus on those specific processes" (Brailsford, 1980). The results of this study suggest that, within the context of the instructional program as set out in this study, when students are made aware of strategies and receive instruction and practice in their use, they can recognize when the use of these strategies would be appropriate and apply the strategies more effectively. The results also suggest that the instructional program used in this study was effective in teaching the reader to spontaneously increase use of Most Productive strategies.

Conclusion 2: Counterproductive Strategies

The instructional program, as set out in this study, was effective in decreasing the use of Counterproductive strategies. It appeared that the use of Counterproductive strategies was easily recognized by students, and therefore, they were aware of when the use of an alternate strategy would be appropriate.

Conclusion 3: Reading Comprehension

Instruction of inferencing strategies was not a factor in increasing reading comprehension ability as measured by the New Developmental Reading Test, Form A and Form B, administered before and after instruction.

Hess (1982) suggested that direct instruction in comprehension would be effective in increasing comprehension in reading. Although the instructional program was effective in altering students' inferencing behavior, it may be that the four weeks during which instruction

occurred was not long enough to effect significant increases in overall reading comprehension scores.

Implications for Further Research

The findings and conclusions of this study suggest areas for further research.

1. The study was limited to fifteen students, eight in the experimental group and seven in the control group. The sample size should be increased and the study replicated to determine if the significant differences occurring in this study would occur with a larger group.
2. The study was limited to grade six students. It may be that the instructional program, as set out in this study, would not be effective in altering the inferencing behavior of subjects at other grade levels. The study should be replicated with students at a variety of grade levels.
3. The instructional program consisted of nine lessons conducted over a period of four weeks. The study should be replicated with a greater number of instructional sessions and/or continued over a longer period of time to determine if the effects of the instructional program on altering inferencing behavior and reading comprehension would have greater significant where the instructional time was increased.
4. Eight of the nine lessons with students were conducted on an individual basis. The study should be replicated with appropriate modifications to the instructional program to determine if these strategies can be learned in a small group or regular classroom setting.

5. General reading comprehension ability was measured by one standardized reading test, i.e. The New Developmental Reading Test. It is recommended that the study be replicated with several different general reading tests used to assess comprehension before and after instruction, and a comparison made of the results.

Implications of the Findings for Pedagogical Practice

Because the ten inferencing strategies identified by Phillips-Riggs were used by subjects in the present study to comprehend narrative discourse, Phillips-Riggs' findings, in terms of the strategies used by readers to generate inferences, were validated.

Although the instructional program of inferencing strategies, as set out in this study, did not significantly increase comprehension ability as measured by The New Developmental Reading Test, it was effective in increasing grade six students' efficiency in processing the written text, in that subjects used a greater percentage of Most Productive strategies and a smaller percentage of Counterproductive strategies. In light of this, the results suggest that students should be given explicit instruction in the process of inference in terms of what inferences are, why they are important, and how they can be generated through the use of inferencing strategies. Opportunities for students to practice using inferencing strategies, when reading, should be provided. Students should be encouraged to ask themselves questions about what is being read, to think of all possible answers to these questions, and to hold these answers tentatively until additional information is understood and the appropriate answer can be verified. Readers should be encouraged to expect that what they read should make

sense, and to recognize when they are confused about text information. They should be encouraged to restate text information and relate their own knowledge and personal experiences to this information to assist them in making sense of the print.

Since the findings of this study have limited generalizability, it is difficult to make specific recommendations for application to the development of reading curriculum, reading programs, or classroom reading comprehension instruction. If the study was replicated with a longer period of time provided for the instructional program set out in this study and results showed that the instructional program was effective in significantly increasing reading comprehension, then several recommendations would be appropriate. Curriculum developers should consider a strategy approach to reading comprehension instruction. Reading programs should include information on the inference process and the strategies used by readers to generate inferences. Suggestions on how this information could be conveyed to students should be provided and opportunities for practice in the application of these strategies to narrative discourse should be encouraged. Reading education classes and teacher inservices should develop an awareness of inferencing strategies and provide suggestions on how they could be altered through explicit instruction and practice in the classroom. The design and implementation of a reading comprehension instruction program focusing on the inference process for use in the regular classroom setting requires further exploration.

Concluding Statement

This study tested the efficacy of an instructional program designed to increase reading comprehension by developing an awareness of and an ability to use those strategies identified as Most Productive in the generation of inferences and to minimize use of those strategies identified as Counterproductive in the generation of inferences. Data obtained indicated that while the instructional program, as set out in this study, was not effective in increasing overall reading comprehension, it was effective in increasing the efficiency with which narrative discourse was processed by significantly altering the grade six average readers' inferencing behaviors.

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APPENDIX A

EXAMPLE OF PHILLIPS-RIGGS' NARRATIVE PASSAGE

EXAMPLE OF PHILLIPS-RIGGS' NARRATIVE PASSAGE

Skiing

Episode A: The slope was covered with people. But there was room for lots more.

Episode B: Marty's heart pounded with excitement as he raced past the chalet to join them. He was scared a little.

Episode C: He had all new gear. He was anxious as he waited in line for the chairlift. He checked his boots and bindings.

Episode D: The run was steep and had powder snow at the top. Marty dodged and weaved every mogul without a wipeout.

Episode E: The steel edges saved him from crashing into the lineup.

Episode F: Yes, skiing is a good way to spend a winter's day.

APPENDIX B

PRETEST NARRATIVE PASSAGE A AND INFERENCE QUESTIONS

PRETEST NARRATIVE PASSAGE A AND INFERENCE QUESTIONS

The Sneaker Crisis

Episode 1: Day after day she went around the house picking up. She picked up shoes and toys and socks and shirts and gloves and boots and books and puzzles and pennies and pencils and stuffed animals and bones the dog had left under the living-room furniture.

Everytime she picked something up, which was often, she put it down somewhere else where it belonged better than it did where she had found it. Then sometime later when someone in the family needed it, she usually knew where it was. If she could not remember at once, the article was apt to remain lost forever.

Episode 2: One morning Larry came to the top of the back stairs and inquired gently who had stolen his sneaker.

Mother opened her mouth to answer, found her mind a blank, and closed her mouth again. Larry crashed down the stairs and into the den, and plunked his one remaining sneaker down on the desk where she was reading the morning paper. "I have to play basketball," said Larry. "I can't play on the basketball court without sneakers. So I need--."

"Have you looked?" asked Mother. "In your room? Under your bed?"

"Yeah, sure." He thought. "It's not there though."

Episode 3: "Well," Mother said helplessly, "you had it last Saturday."

"I <u>know</u> I had it last Saturday!" said Larry.

"Wait!" Mother said, and stood at the front of the stairs and called, "Janet, have you seen Larry's sneaker?"

"No, I haven't."

"Sally, Barry," Mother called to the basement. "Have either of you seen Larry's sneaker?"

"No."

"So what am I supposed to do?" asked Larry. "Play basketball in my socks or something?"

"Are you sure you looked under your bed?" Mother asked.

Episode 4: "Yeah," he said scornfully. "Yeah, lady. I'm sure. Never find anything around here," he complained. "Nothing's ever where you put it. Always coming and picking up stuff and putting it away where a person can't find them." He opened his eyes wide. "Gym! I wore them Wednesday in the gym. So I had them on Wednesday."

Episode 5: "And on Wednesday evening Larry was going to the school dance," said Janet who had just come in.

"And you took a shower before you went to the dance," Mother said. She suddenly remembered. "I saw it! I came upstairs to have a rest after you had finally gone to the dance, and I remember the way you left the bathroom--the floor sopping, and dirty towels all over, and the soap and--"

Episode 6: "The sneaker!" Larry quickly interrupted. "Just stay on the subject."

"Well, it was lying just inside the door, and one wet towel was half on top of it." Mother thought. "What did I do with it?"

"Think, think," said Larry, flapping his hands with impatience.

Episode 7: "Sneaker, sneaker," called Sally and Barry, who were in their glory. Larry raced past mother.

"Have you got it, Sal?" he yelled. "You <u>did</u> find it! Gee, thanks, kids. Where did you find it?"

"Under your bed," Sally said.

Episode 8: "Gosh," Larry said, pleased. "I'm going to drive to the store right now and get you kids a popsicle." Larry turned to his mother. "The other sneaker," he said. "I have to go down and get those popsicles, so let's have it."

Episode 9: "What?" asked Mother.

"The other sneaker. The one I gave you when I first came downstairs," said Larry.

Uncomfortable, she looked down at her empty hands. "Now, let's see," she said, "I had it just moments ago..." Her mind was a perfect blank.

Inference Questions

Episode 1: A. Who do you think is picking up around the house?

Episode 2: A. Where do you think the sneaker is?

B. Do you think Larry looked in his room?

Episode 3: Who are Sally and Barry?

Episode 4: Why does Larry have such a hard time keeping track of his things?

Episode 5: Why did the lady have to have a rest so early in the morning?

Episode 6: Explain Larry's remark, "Just stay on the subject." Why didn't he want her to start talking about the mess in the bathroom?

Episode 7: Why were Sally and Barry in their glory?

Episode 8: A. Do you think this family lives in the city or the country?

B. How old do you think Larry is?

Episode 9: A. Why was the lady uncomfortable?

B. How soon will the mother be able to find the other sneaker?

APPENDIX C

STRUCTURE OF NARRATIVE PASSAGES

STRUCTURE OF NARRATIVE PASSAGES

TITLE	SERIES FROM WHICH PASSAGE WAS ADAPTED	NUMBER OF WORDS	NUMBER OF DECLARATIVE SENTENCES	NUMBER OF EXCLAMATORY SENTENCES	NUMBER OF INTERROGATIVE SENTENCES	TOTAL NUMBER OF SENTENCES	NUMBER OF EPISODES	Readability Level	
								RIX	NOUN FREQUENCY
THE SNEAKER CRISIS (Pretest Passage A)	GINN "STARTING POINTS"	579	50	5	12	67	9	4	4
THE WATCHERS	GINN "STARTING POINTS"	550	39	4	1	44	9	4	4
LIFE WITH FATHER	GINN "STARTING POINTS"	558	43	6	1	50	9	5	5
HOCKEY FEVER	GINN "STARTING POINTS"	561	48	4	5	57	9	5	5
TRAIL OF THE SANDHILL STAG	GINN "STARTING POINTS"	552	27	2	1	30	9	6	6
ELBOW GREASE (Passage B)	GINN "STARTING POINTS"	585	44	4	4	52	9	5	5
THE CONJUROR'S REVENGE (Posttest Passage C)	GAGE "STRATEGIES"	564	39	4	6	49	9	6	6

APPENDIX D

NARRATIVE PASSAGE B AND INFERENCE QUESTIONS

NARRATIVE PASSAGE B AND INFERENCE QUESTIONS

Elbow Grease

Episode 1: "Do a good job of washing the surrey," said Father. "And use lots of elbow grease when you shine the wheels."

David found a bucket by the watering trough, pumped it full, and lugged it to the drive-shed. He got between the shafts of the surrey and hauled it out into the sunshine. Near the woodpile he found an old shirt which would do for a washrag.

Episode 2: Then he looked for the elbow grease. The drive-shed shelf yielded a can of black grease, which he had seen his father apply to the axle of the surrey last Saturday before driving to the nearby town. He regarded it doubtfully. Best to make sure. He ran across the yard to the summer kitchen, picked up a slab of yellow lye soap from the washbench, and poked his head inside the door.

Episode 3: "Out," said his mother firmly.

"Papa said I could wash the surrey."

"Then stop fooling around and get to work."

"He said to use elbow grease."

"Then use it! Last time you didn't give it any more than a lick and a promise. Get busy now, and don't be bothering me!" She whipped a chicken out of the oven and brushed the hair from her eyes.

Episode 4: Back at the surrey he surveyed the mud-stained wheels, looked at the bucket of water, contemplated the can of grease. Should the elbow grease come first or last? He dug out a handful and applied it to the spokes of the nearest wheel. It didn't look quite right, so he rubbed some of it on the side of the buggy. Black and slippery, it failed to improve the appearance of the surrey no matter how vigorously he rubbed; on the contrary, the resulting mess convinced him that he had made a mistake. Elbow grease was clearly designed to provide a finishing touch, a glossy finish. He picked up the washrag and fell to work washing the surrey off.

Episode 5: This was not easy. The black grease was strangely resistant to water and he merely succeeded in spreading it across the side of the surrey and along the spokes in oily smears. The washrag turned black. So did the water in the bucket and the yellow soap. He gazed at the result in mounting dismay.

The surrey wheel, instead of shedding its coat of encrusted dry mud to reveal shining red spokes, began to look as if it had just emerged from a swamp. He rinsed out the rag, went back for more water, and attacked the dismal job again.

Episode 6: Beads of sweat rolled off his brow. He brushed them away with a greasy hand, then tried to rub his hand clean on his shirt.

Episode 7: "Great Scott!"

He hadn't heard his father come up behind him.

"What on earth are you doing to my surrey?"

Episode 8: David gulped. "It's the elbow grease," he explained. "I shouldn't have put it on first."

Mr. Graham shook his head in amazement, gingerly rubbed a finger against the side of the surrey and examined the result.

"The horse is never going to recognize this carriage, that's for sure. What kind of grease did you use?"

"Elbow grease. I found it in this can."

Episode 9: "You don't know what elbow grease is?"

David, shaking his head, exclaimed dismally, "It isn't that stuff, I guess."

"Elbow grease means putting some strength into it," said Father. "Great Scott! Elbow grease."

David thought he detected a little quirk at the side of his father's mouth, like a grin trying not to escape.

Preliminary Questions

A. What is elbow grease?

B. What is a surrey?

Inference Questions

Episode 1: When did this story take place?

Episode 2: Does this family live in the city or in the country?

Episode 3: Why is the mother acting so impatient with David?

Episode 4: What's elbow grease?

Episode 5: "The black grease was strangely resistant to water." What does this mean?

Episode 6: What do you think David looks like now? Why?

Episode 7: How do you think the father feels when he sees the surrey?

Episode 8: A. Why did David gulp?

B. Does David know what elbow grease is now? How do you know?

C. How old would David be?

D. What is a surrey?

Episode 9: There was "a little quirk at the side of his father's mouth, like a grin trying not to escape."

A. What does that mean?

B. Why was this happening?

APPENDIX E

POSTTEST NARRATIVE PASSAGE C AND INFERENCE QUESTIONS

POSTTEST NARRATIVE PASSAGE C AND INFERENCE QUESTIONS

The Conjuror's Revenge

Episode 1: "Now, ladies and gentlemen," said the conjuror, "having shown you that the cloth is absolutely empty, I will proceed to take from it a bowl of goldfish. Presto!"

All around the hall people were saying, "Oh, how wonderful! How does he do it?"

But the Quick Man on the front seat said in a big whisper to the people near him, "He-had-it-up-his-sleeve."

Episode 2: Then the people nodded brightly at the Quick Man and said, "Of course!"; and everybody whispered round the hall, "He-had-it-up-his-sleeve."

"For my next trick," said the magician, "you will notice that these rings are apparently separate; at a blow they all join. Presto!"

Episode 3: There was a general buzz of amazement till the Quick Man was heard to whisper, "He-must-have-had-it-up-his-sleeve."

Again everybody nodded and whispered, "The-rings-were-up-his-sleeve."

The brow of the magician was clouded with a gathering frown.

Episode 4: "I will now," he continued, "show you a most amusing trick by which I am enabled to take any number of eggs from a hat. Will some gentleman kindly lend me his hat? Ah, thank-you. Presto!"

He extracted seventeen eggs, and for thirty-five seconds the audience began to think that he was wonderful. Then the Quick Man whispered along the front bench, "He-has-a-hen-up-his-sleeve," and all the people whispered it on. "He-has-a-hen-up-his-sleeve."

The egg trick was ruined.

Episode 5: It went on like that all evening. The reputation of the conjuror was rapidly sinking below zero.

At the close of the evening he rallied for a final effort. "Ladies and gentlemen," he said, "I will present to you, in conclusion, a most astounding trick. Will you, sir," he continued, turning toward the Quick Man, "kindly hand me your

gold watch?"

Episode 6: It was passed to him.

"Have I your permission to pound it to pieces?" he asked savagely.

The Quick Man nodded and smiled.

The magician grasped a hammer from the table. There was a sound of violent smashing. "He's-slipped-it-up-his-sleeve," whispered the Quick Man.

Episode 7: "Now, sir," continued the conjuror, "will you allow me to take your handkerchief and punch holes in it? Thank-you. You see, ladies and gentlemen, there is no deception; the holes are visible to the eye."

The face of the Quick Man beamed. This time the real mystery of the thing fascinated him.

Episode 8: "And now, sir, will you kindly pass me your hat and allow me to dance on it? Thank-you. And will you allow me to smash your spectacles? Thank-you."

By this time, the features of the Quick Man were assuming a puzzled expression. "This thing beats me," he whispered. "I can't see through it a bit."

Episode 9: There was a great hush upon the audience. Then the conjuror drew himself up to his full height and, with a withering look at the Quick Man, he concluded:

"Ladies and gentlemen, you will observe that I have, with this gentleman's permission, broken his watch, punched holes in his handkerchief, smashed his spectacles, and danced on his hat. And now, the performance is at an end.

Amid a glorious burst of music from the orchestra, and thunderous applause, the curtain fell, and the audience dispersed, convinced that there are some tricks, at any rate, that are not done up the magician's sleeve.

Preliminary Question

A. What's a conjuror?

Inference Questions

Episode 1: What's a conjuror?

Episode 2: Do the people near the Quick Man believe him?

Episode 3: How did the conjuror feel?

Episode 4: A. Why did the audience think the conjuror was wonderful for only 35 seconds?

B. Do they believe the Quick Man?

C. Why was the egg trick ruined?

D. Do you think the Quick Man was right?

Episode 5: A. Why was the conjuror's reputation sinking?

B. What is going to happen next?

Episode 6: A. The conjuror asked for permission to pound the watch to pieces "savagely". Why did he ask it "savagely"?

B. "There was a sound of violent smashing." What happened?

C. Does the Quick Man believe him?

D. Do you believe that the conjuror has really smashed the spectacles?

Episode 7: Why was the Quick Man beaming?

Episode 8: Why was the Quick Man puzzled?

Episode 9: A. "A hush came over the audience." Why?

B. How did the audience feel about the conjuror's last trick?

C. Is The Conjuror's Revenge a good title for the story? What was the conjuror's revenge?

APPENDIX F

CONTENT OF PRETEST NARRATIVE PASSAGE A AND POSTTEST NARRATIVE PASSAGE C

EPISODAL CONTENT OF PASSAGE A AND PASSAGE C

Story Schema	Episode	Passage A Major Events	Passage C Major Events
Introduction	1	A person is cleaning up after everyone.	The conjuror performs his first trick. A Quick Man suggests that there is no magic involved.
Problem	2	Larry loses his shoe. Mother suggests that he look in his room under the bed.	The audience agrees with the Quick Man that the conjuror had the trick up his sleeve. The conjuror performs his second trick.
Attempts at Solution	3	Mother asks the rest of the family if they have seen the sneaker.	The Quick Man convinces the audience that this trick is also up the conjuror's sleeve. The conjuror gets upset.
	4	Larry remembers having the sneakers at school on Wednesday.	The conjuror's next trick, which obviously involves real magic, is ruined by the Quick Man.
	5	Mother remembers seeing the sneaker in the bathroom on Wednesday evening.	With his reputation fast diminishing, the conjuror asks for the Quick Man's watch in order to perform one last trick.
	6	Mother tries to remember where she put the sneaker.	An angry conjuror gets the Quick Man's permission to pound the watch to pieces. The Quick Man thinks the watch is up his sleeve.

Story Schema	Episode	Passage A Major Events	Passage C Major Events
Resolution of Passage A	7	Larry's brother and sister find the sneaker under Larry's bed.	The conjuror also ruins the Quick Man's handkerchief. The Quick Man begins to appreciate the "magi "magic".
	8	Larry asks the mother for the other sneaker.	The conjuror ruins the Quick Man's spectacles. The Quick Man is mystified.
Resolution of Passage C	9	The other sneaker is now lost.	The conjuror gets his revenge along with a renewed respect of the audience for his work.

APPENDIX G

TRANSCRIPTION OF THE INTRODUCTORY GROUP LESSON

Transcription of the Introductory Group Lesson

The Investigator (I) began by saying: As you know, I've been doing a lot of work in Reading at the University this year. One of the areas in reading that really interests me is that of Inference. Does anybody know what you do when you make an inference?

Student Response (SR): No response.

I: Let me give you an example. I've written a paragraph on this card. Read the paragraph and then I'll ask you a question about what you read.

The paragraph was presented to the group.

> The children put on their coats, mitts, boots and toques. Then they got out their toboggans and went to play in the snow.

I: The question is, "What season is it?"

SR: Winter.

I: Right. If you were thinking winter you were correct. How did you know it was winter? Did the author say it was winter?

SR: No.

I: Then how did you know that?

SR: They went out in the snow.

Because they put on their coats, boots and mitts.

And the word "toques".

I: Right. Is there anything else the author said that would tell you it was winter?

SR: They had a toboggan.

I: Good. When you used all the information to figure out that it was winter even when the author didn't tell you that specifically, you were making an inference. Basically there are two places we get information from when we make these inferences or come up with information that the author didn't state in words but wanted us to know. One is the print, - the words on the page. What's the other place?

SR: No response.

I: Let me help you here. Suppose the author said, "The children put on their harbraks and went to play in the froomigan."

SR: What are those?

I: Good question. Are you able to understand what the author wants you to understand?

SR: No.

I: Why not?

SR: Because we don't know what those words mean.

I: Would someone who didn't recognize the words "snow" or "toboggan" or "toque" know that the season was winter?

SR: No. They might think a framigle or whatever was a kind of toy.

I: Right. So what's the other source of information we use when we're reading?

SR: What we already know?

I: Right. Our own knowledge. We use both the information from the print and our own knowledge when we're reading to understand all the information that the author wants us to know but didn't really say in words. When we do this, we are making inferences. Sometimes we say we "read between the lines." One of the jobs the reader must do is understand everything the author is trying to tell us, even the information not written down in actual words, that is, we have to make inferences. There are some important things we can do when we're reading that will help us make these inferences. There are also some important things we shouldn't do when we're reading because they can stop us from making the right inferences and make us unable to understand everything the author wants us to. These right and wrong things to do are called strategies. Today I just want to give you a general idea of what each strategy is and how each one works to help or stop us from making inferences.

The investigator summarized each strategy on a large sheet or card. Each summary is noted in parentheses following the explanation.

I: First I'll tell you the strategies which will help you make inferences.

The first strategy is to ask questions, not just the main question like, "Will he find the sneaker?" but other less important questions like, "Who is it that is picking everything up?" (1. Ask questions.)

The second strategy is to think of all the possible answers to the questions. You don't have to decide on a right answer until you have all the information. For example, "Where is the sneaker?" It could be in the closet, in the bathroom, at school, under the bed. If you keep all these places in mind, then as you read, you can narrow down the range of answers. (2. Think of all possible answers; don't decide until you have all the information.)

The third strategy is to have reasons for your ideas about what you read. This way you can be more sure that your answers make sense in the story. These reasons will come from two places, the print, and your own knowledge. For example, many of you thought it was the mother who was picking up. Eventually the print confirmed this, but also your own knowledge told you that usually it's the mother who does the cleaning. (3. a. Give reasons; b. Make sense by using your own knowledge as well as the print.)

The fourth strategy is to put yourself in the place of the characters in the story. For example, pretend you are the mother. How would she feel in this situation? How would she be reacting to this person losing everything all the time? Now do you understand why she had to have a rest? Doing this helps you to better understand all the information the author wanted you to have. (4. Use your own experience.) Now I'll tell you the strategies which can stop you from making the inferences the author wants you to make.

The first one is when you have some ideas about the story which don't make sense with either the print or your own knowledge. For example, would it make sense that Sally and Barry were some kids in the neighbourhood just kind of hanging around the house? That really doesn't make sense when you think about the story. (Doesn't make sense.)

The other strategy that doesn't help you understand the story better is when you don't have any answer at all. Try to come up with some ideas, even if they may not be exactly right. (No response.)

In the lessons we will have together during the next few weeks, we will be working on using the "good" strategies more often. We'll also be working on using these good strategies instead of the ones that stop you from making correct inferences.

APPENDIX H

TRANSCRIPTION OF ONE INDIVIDUAL LESSON

Typical Individual Lesson

Review of the Concept

I: Let's do a little review of some of the things that we've been talking about during our meetings together. Tell me, what are some of the strategies that help you when you're reading and some of the strategies that don't help you when you're reading? Let's write them down.

S: Okay, to give reasons to your answers.

I: And can you remember where those reasons come from?

S: The textbook, your own knowledge, and your own experience.

I: By "your own experience", do you mean that you imagine yourself in that situation?

S: Right. And give good words, like if you're not sure then use "maybe", and "I think" and "or".

I: Right, we use all of those tentative words when we're not sure, "Maybe", "I think", "could be", "might be", "perhaps", and the other one that you mentioned, "or". Think of several possibilities when you're not sure, list or say or think of several alternatives that the answer could be, and then as you read further, it will become clearer which ones aren't right. You don't have to decide until later when you have more information. Okay, anything else?

S: Ask questions.

I: Right, not just about how the story will end, but all the other questions that will help you understand as you're reading. Questions about words that you may not know the meaning for, questions about things that were confusing to you while you were reading, things you're wondering about the story that you're going to try and clear up as you go along. The important thing about the asking of the questions is the answering of the questions, so once you pose a question, you should try and make sure that somewhere along the line, while you're reading, you answer that question. So try to keep them in mind as you read. There's one more thing about not being sure. We talked about not making up your mind right away. When you read something that's confusing or that seemed right at the time but later as you're reading, doesn't seem to make sense, then you should be prepared to change your mind, about either the old thought, or about the new thought. Can you remember some things that we talked about that did not help as you were reading?

S: Don't say, "I don't know." Give it a try.

I: How can you give it a try?

S: Well, you can think about the story and see what...well, actually looking in the story to answer the question.

I: Are you saying to reread?

S: Yes, just skim through it.

I: And then if you don't know, what are the strategies you could be using?

S: You could be using tentative words.

I: I think, first of all, what you could be doing is asking questions. If you don't know, then you could say, well, this is what I do know, but I can't understand this part, "What did he do with the sneaker?" Now you're going to try and answer the question about what you don't know, and in answering, you're going to give several possibilities by using the "or" as well as all the tentative words we discussed earlier. It could be in the closet or it could be in the gym, or it could be under the bed, or it could be downstairs. It could be in a lot of different places. And then you're going to try to give reasons for each of those possibilities. You could use your own knowledge, for example, "he had one sneaker at home and it's really unlikely that any person would just leave one sneaker in the gym. That possibility doesn't make a lot of sense, I don't think it could be in the gym." You could use what is in the text for reasons. For example, "the sneaker must be in the house because only a few days ago, after he'd been to the gym, someone saw it in the bathroom." All of these Most Productive strategies keep going round and round in a circle, "ask questions", "make tentative guesses", "give reasons, using the text and your own knowledge", "use your own experience". What are the other strategies that are not helpful when you're reading?

S: When you say things that don't make sense. You should always try to make it make sense.

Application, Discussion, Questioning and Feedback

I: Good. Okay, the passage that we're going to read today is called The Watchers. Let me ask you, What do we do when I say to you, "The Watchers. This is a story about Chris who makes a choice between a gang of regular kids and a boy who is different." What do you do that is going to help you make sense of this story?

S: You should ask questions.

I: What are some questions that you might ask?

S: What type of boy is Chris? Does he hang around this gang? What does this gang do? Who's this boy?

I: A couple of other questions that you might want to ask come directly from the introduction. What kind of choice does Chris make? What is that all about? And how is this boy different? Make sure you use all the clues you can before you even start to read the story to ask questions. These questions give you a focus for the story that you are going to read. Okay, read the first page silently.

S: (After reading the first episode) Okay, this boy Jeff, he thinks he's really big and he's pushing around this boy named Sam, he's telling him to write, "Jeff is the greatest" on the school wall, and Sam, I guess he's afraid of him and I guess Chris is watching him and when he's writing his hands shake and I guess his writing looks like he's in kindergarten.

I: So what do you think?

S: I think I know a little bit about what the story, The Watchers, could be about. It could be about how Chris is watching this gang push around this boy named Sam, and he makes a choice, either the gang, or Sam.

I: Okay, that's good. What you're doing is trying to predict by asking questions and giving answers for what might happen. You're asking, "What does this have to do with the story, what about the questions that I first asked?" Now you're trying to give some tentative answers. You used the words, "I think", "maybe", so you're making good use of that strategy. Even if those things don't happen, that's all right, because you can change your mind anytime, right?

S: Right.

I: There are two things here that you said. You said, "Jeff thinks he's really big." What makes you think this?

S: By the way he gave the boy the chalk and then pushed him against the wall.

I: What strategy were you making use of when you gave me that answer?

S: I was giving reasons.

I: Right, and where were the reasons coming from?

S: From the text.

I: Excellent. You also said, "I guess Sam's afraid." What makes you think that?

S: He wrote...the boy said, "It looked like he was in kindergarten, the way he was writing, he was shaking so much, so that's why I think he was afraid of them.

I: Let's go on to read the next page, because maybe more information will clarify something for you.

S: (After reading the next episode) In this part, Jeff's friend Tommy, he grabbed the chalk from Sam's hand and showing him, "this is the way you write." And then I guess Chris, he's saying to himself, or somehow he's saying that his mother had told him, his friend told him that he Sam, couldn't write very well.

I: Let's talk about that one. Did that seem confusing to you?

S: Yes, a little.

I: The reason I say, "Did that confuse you" is that it took you a long time to say what you were thinking, it seemed to me that you were confused.

S: I could ask questions and see why it confused me.

I: Do you want to try and work that out? (Pause) What are you doing right now?

S: Rereading.

I: Good. That makes sense.

S: (After rereading) This person named Zipp had told Jeff's mother that the boy wasn't regular like everyone else, like he's slow learning.

I: So what about his shaky writing on the wall? Does that make more sense to you now?

S: Yes, well, because he's slow learning, maybe he couldn't write that well.

I: So what do you think about that?

S: That...maybe that's how he's different, that he's slow learning.

I: Okay. Let's go back to the first page of the story. It says, "I could see that something was bugging him, but I wasn't sure what." What do you think was bugging him?

S: Well, Sam can't write very well, and he's probably sort of ashamed that he can't and he doesn't want anyone to know.

I: Do you feel more satisfied with your understanding of what you read?

S: Yes.

I: Okay, let's go on to the next page.

S: (After reading the next episode) Okay, it seems like Jeff has to bribe people to be friends with him, probably he isn't a very nice person that way he was pushing Sam around and laughing at him, so he has to bribe people to be his friend.

I: Do you know what you just did, what strategies you just used? You said he has to bribe people to be friends with him. Now it didn't say that in the story, right, so you are making an inference and then you ...

S: Gave a reason.

I: Right, and you gave it from the text. Are you wondering anything?

S: Yeah, what Sam's going to do.

I: What strategy did you just use?

S: I'm asking questions.

I: Right. What do you think he's going to do?

S: I think he'll try to get away.

I: When you say, "I think" is that a guess, or is that just I think he'll try to get away?

S: It's a maybe, because I'm not sure.

I: So what strategy would that be?

S: It's just a possible answer and I won't decide for sure right now. I might change my mind later.

Review of Concept

I: Let's review some of the strategies we talked about today. You are doing a good job of asking questions and giving tentative answers by using words like, "I think", "maybe", and "could be". Instead of having no answer at all, you are willing to think of some possible answers until you get more information. Something we need to work on together is when you are confused by what you read. You have to just stop and say, "I'm confused. This doesn't make sense." This lets you know that you have to work harder to make sense, and that it's a good time to use those Most Productive strategies. Ask

questions, think of several possible answers, give reasons for those answers by using both the text and your own knowledge. Put yourself in the place of the characters in the story to understand their feelings and reasons for doing and saying things.

Transfer of Concept

I: So remember, when you're reading anything, here, in your classroom, at home, don't be afraid to say to yourself, "I'm confused. I'll stop reading right now and try to use some of those good strategies to make more sense.

APPENDIX I

EXAMPLE OF STUDENT PROTOCOL DIVIDED INTO CLAUSAL UNITS WITH IRRELEVANT DATA ELIMINATED

EXAMPLE OF STUDENT PROTOCOL DIVIDED INTO CLAUSAL UNITS WITH IRRELEVANT DATA ELIMINATED

Key: / / Clausal Unit

() Irrelevant Data

Episode Three:

S: (Well) he's asking everybody/if they saw the sneaker./ Everybody's saying no/and they said, "Are you really positive that you haven't looked under your bed?"/ (Doesn't tell you if he has or not.)

I: So what do you think about what you read?

S: Sounds like he's lazy/the way he stalls/and just waiting for his mom to go up/and do it./

Inference Question 3: /Probably the sister and brother./

I: Why do you think that?

S: /(Well) the mother yelling at them, "Have you seen it?"/I guess that'd be Larry's sister and brother./

I: Are you wondering anything about what you read?

S: /No./

I: What do you think might happen next?

S: /He's going to go start looking/and he's going to go buy new shoes/ and then she's going to find it/and get real mad at him probably./

Episode Four:

S: /I think now he realized/he left it somewhere/and it's not his mom's fault/and he's kind of a mouthy person (sounds like)/and (he) ten to one he's not saying, "Sorry for blaming it on you."/so I think he's going to go to the gym/and he's going to find it./

I: So where do you think the sneaker is then?

S: /In the gym./

I: You said he was mouthy. What makes you think that?

S: /(Well he goes) "Yeah, lady."/

Inference Question 4: /Very disorganized./

I: In what way?

S: /Just puts things somewhere/and then forgets about them./ Never can find them./

I: Are you wondering anything about what you read?

S: /No./

I: What do you think might happen next?

S: /He's going to go to the gym/and it probably won't be there./

I: Where do you think it will be?

S: /I think somebody might have put it in the lost and found/or it's at the office (or something ./

Episode 5:

S: /(Well, it) they're starting to remember/he took a shower/and he's really messy/there's dirt everywhere/and towels all over the place/ and everything starts coming back/and she says, "You probably left it in the bathroom."/

I: So what do you think about what you read?

S: /(I think he'll go and he'll...he) somebody would have kicked it somewhere/it'll be hidden somewhere in the bathroom/and he'll have trouble looking for it/and he won't bother/he'll get his mom to./

Inference Question 5: /To get rid of all her kids/if they're all in high school/(I don't know) or junior high/get rid of them all/and give her nerves a break./

I: Why would she want to give her nerves a break?

S: /(Cause...I don't know) Cause she's always (you know) "Are you sure?"/and she's picking up everything/and getting yelled at (and everything)/so everybody starts yelling in the house (and everything)/ and then they're all gone/and it's peace and quiet in the house for awhile./

I: Are you wondering anything about what you read?

S: /No./

I: What do you think might happen next?

S: /I think it's going to be hidden/somewhere in the bathroom./

(from The Sneaker Crisis, Passage A)

APPENDIX J

FREE RECALL WITH TEXT SPECIFIC, TEXT ERRONEOUS AND INFERENTIAL CLAUSES IDENTIFIED

FREE RECALL WITH TEXT SPECIFIC, TEXT ERRONEOUS AND INFERENTIAL CLAUSES IDENTIFIED

Key: / / Clausal Unit

() Irrelevant Data

TS = Text Specific

TE = Text Erroneous

I = Inference

Episode 1:

/The story is about a girl picking up shoes,toys/and sometimes she picks
things up/and then she puts them back down/so if a person in the family
needs it/then she'll know where it is./

Episode 2:

/She doesn't remember seeing (his sneakers) Larry's sneakers/and she was
asking him to look in his room (and things like that)/and he thought
that he looked in there./

Episode 3:

/She asked the three other children/if they saw his sneakers/and they
didn't/and she says, "Are you sure you looked under your bed?"/

Episode 4:

/(Well) he had gym on Wednesday/and they're at school in his locker./

Episode 5:

/Wednesday evening they had a dance/and he had a shower/and then he left
the bathroom in a mess/and towels all over/and the sneakers were in the

TE
bathroom./

Episode 6:

TS
/(There was) it was just by the door/there was a towel on one of the
TS I TS
sneakers/and not on the other one/and Larry was getting really impatient/
I
he's waiting to get his sneakers/or else he'll be late for the basketball
I TS I
game/and he goes, "Think, think, think./so she'll remember./

Episode 7:

TE
/(They found it under her bed and she) Sally found them under her bed/
TE
and they're still talking about where the sneakers were/and (they) Sally
TE TE
interrupted them/and "I found them, I found them."/

Episode 8:

TS
/He said he's going to get some popsicles/and now he needs the other
TS I
sneaker/cause they found his sneakers/(so they're going to get him a
TS
pops...like...she...) he's going to get them a popsicle./

Episode 9:

I
/He gave the sneaker to his mother/and he says, "My other sneaker
TS TS
please."/and her mind was just a blank/she couldn't remember where she
I I
put them/so they'll probably find them in quite awhile/she might have
I I
put it down on the table/or on the floor./

APPENDIX K

PROTOTYPE OF PROTOCOL WITH INFERENCING STRATEGIES ASSIGNED

Prototype of Protocol with Inferencing Strategies Assigned

Key:
- / / Clausal Unit
- () Irrelevant Data
- TS = Text Specific
- TE = Text Erroneous
- MP1 = Most Productive Strategy One (Shifting of Focus)
- MP2a = Most Productive Strategy Two (Tentative Interpretation)
- MP2b = Most Productive Strategy Two (Analyzing Alternatives)
- MP3a = Most Productive Strategy Three (Confirming an Immediate Prior Interpretation)
- MP3b = Most Productive Strategy Three (Consistent with Preceding Episodes)
- MP4 = Most Productive Strategy Four (Empathizing from Experience)
- P1 = Productive Strategy One (Rebinding)
- P2 = Productive Strategy Two (Questioning a Default Interpretation and/or Direct or Indirect Conflict)
- P3 = Productive Strategy Three (Confirming a Non-Immediate Prior Interpretation)
- CP1 = Counterproductive Strategy One (Assigning an Alternate Case)
- CP2 = Counterproductive Strategy Two (Assuming a Default Interpretation and Transforming Information)
- CP3a = Counterproductive Strategy Three (Neglecting to Respond)
- CP3b = Counterproductive Strategy Three (Holding Information)

Episode 1:

MP2a/MP3b TS
S: This person/I think it's the mother/is picking up after the children./
TS TS
If the children need something/she would know where she put it/but if
TS TS
she couldn't remember/it would be lost forever./

I: So why do you think it's the mother?

MP3a
S: /(Well she) mothers usually pick up after their children./

I: Are you wondering anything about what you read?
CP3a
S: /No./

I: What do you think might happen next?
MP2a/MP3b MP3b
S: /Someone might need something/and ask her where it is./

Episode 2:

P3 TS
S: /It was the mother./ The mother was in the den reading/and then
TS TS
Larry came down/and asked her where his sneaker was/and his mother
TS
said, "Did you look in your room?/

I: So what do you think about what you read?
CP2 CP2
S: /The mother hid the sneaker/to teach Larry a lesson./ Larry should
MP3b MP3b
go and check/and (in the story) he didn't want to./

I: You don't think he checked in his room?
MP3b MP3a →
S: /No, he didn't./ He just thought about it/and then answered./He
P3
didn't want to take the time to go and look./
MP2a/CP2
Inference Question 2: /The mother might have hidden it anywhere./

I: Are you wondering anything about what you read?
MP1
S: /Yes, I'm wondering if they'll find the sneaker./It might be in the
MP2a/MP3b ⌒ MP2b MP3b
in the closet/or under his bed./

Episode 3:

TS
S: /Now the mother's asking Sally and Barry if they'd seen it/and they
TS
said no/and then the mother says, "Are you sure you checked under
TS
the bed?"/

I: So what do you think about what you read?
P3
S: /He didn't look under the bed./

I: Why do you say that?

S: /(Well, he...she...) "Larry, are you sure you checked under your
MP4 MP3b CP2 →
bed?"/and silence/and she's trying to give him a hint/about where she hid it./

I: Is there anything else that let's you know that he didn't look under his bed?

MP4 →
S: /(Well) that's what I do./ My mom says, "Did you look in your room?"/ and I say, "Yeah, mom."/but I didn't/not very well./

CP1 P1
Inference Question 3: /They're friends of Larry's./No/they're his
MP3b MP3a →
brother and sister/because his mother wouldn't ask his friends/if they'd seen his runners around the house./

I: Are you wondering anything about what you read?

MP1
S: /I'm wondering if the mom did hide his sneaker./

I: Do you think she did?

MP2a/P2
S: /No/ I don't think she did./

Episode 4:

TS
S: /Now he's remembering/that he had the sneaker on Saturday at the
TE CP2
gym/and now he thinks it's at the gym./

I: So what do you think about what you read?

CP2 → MP2b
S: /Maybe he'll go to the gym /and find his sneaker/or look under his
MP3b
bed./

Inference Question 4: /(Well she's always...the children) Larry
MP3b MP3b
never puts anything away./ He always leaves all his stuff all over/
CP3b →
never puts it away/never puts any of his things where they belong./

I: Are you wondering anything about what you read?

MP1
S: /Yeah, where is that shoe?/

I: Where do you think it is?

CP1
S: /Maybe the cat hid it somewhere./

APPENDIX L

ONE SUBJECT'S PROTOCOL DIVIDED INTO CLAUSAL UNITS WITH IRRELEVANT DATA AND TEXT RECALL IDENTIFIED, AND INFERENCING STRATEGIES ASSIGNED TO REMAINING CLAUSAL UNITS

One Subject's Protocol Divided into Clausal Units with Irrelevant Data and Text Recall Identified, and Inferencing Strategies Assigned to Remaining Clausal Units

Key:
- / / Clausal Unit
- () Irrelevant Data
- TS = Text Specific
- TE = Text Erroneous
- MP1 = Most Productive Strategy One (Shifting of Focus)
- MP2a = Most Productive Strategy Two (Tentative Interpretation)
- MP2b = Most Productive Strategy Two (Analyzing Alternatives)
- MP3a = Most Productive Strategy Three (Confirming an Immediate Prior Interpretation)
- MP3b = Most Productive Strategy Three (Consistent with Preceding Episodes)
- MP4 = Most Productive Strategy Four (Empathizing from Experience)
- P1 = Productive Strategy One (Rebinding)
- P2 = Productive Strategy Two (Questioning a Default Interpretation and/or Direct or Indirect Conflict)
- P3 = Productive Strategy Three (Confirming a Non-Immediate Prior Interpretation)
- CP1 = Counterproductive Strategy One (Assigning an Alternate Case)
- CP2 = Counterproductive Strategy Two (Assuming a Default Interpretation and Transforming Information)
- CP3a = Counterproductive Strategy Three (Neglecting to Respond)
- CP3b = Counterproductive Strategy Three (Holding Information)

Episode 1:

S: /It's about a girl picking up (after) in her house TS/and putting the stuff where she would remember where it is TS/but if she couldn't

TS TS
remember where it is/it'd be lost./

I: So what do you think about what you read?

S: /(It sounds pretty good.)/

I: What do you mean, "Good"?
MP3b
S: /It's The Sneaker Crisis./ It sounds like she's going to lose all the
MP3b
running shoes in the house(or something)./
MP3b MP2a/MP3b⌒ MP2b
Inference Question 1: /A girl/maybe the older sister/ or the mom in
MP3b
the family./

I: Are you wondering anything about what you read?
MP1 →
S: /What's going to happen next/ whether she's going to lose anything./

Episode 2:
P3
S: /(Now she's) it's the mother/and she's lost (one of the sneakers) one
CP2
of her son's sneakers/and now he't got to go out and play basketball
TE TS
with only one sneaker/and she can't remember where it is/her mind is
TS
blank of where she put it/and so now she's got to find out where it
MP3b
is. /

Inference Question 2a: /Probably (in the...where you come in the
MP2a MP3b⌒ MP2b MP3b
door) right beside the door / or in the closet (or something)./
MP3b MP3b
Inference Question 2b: /No/not really good./

I: What makes you think that?
MP3a
S: /Because of the way he said it./

I: How did he say it?
MP4 MP3a
S: /(Well) "Yeah, yeah, I did."/ And that doesn't sound very convincing./

I: He did say, "Yeah, yeah, sure." You don't think that means he really

did. How do you know that?

MP4
S: /Cause I've done that quite a few times./

I: Are you wondering anything about what you read?
MP1
S: /Yeah, where the sneaker is./

Episode 3:

TS
S: /Now she's asking again if he'd looked under the bed/and (its...not..
TS
like...that's where it ends and) she's asked everybody/he's asked
TE TS MP3b
her sister/and downstairs/there must be somebody down there/and now
TE TS
she's looking for it half and half/and now she's asking him again./

I: So what do you think about what you read?
MP2a/P2
S: /(Well) maybe it is still in his room./

I: Where exactly? Do you know where?
MP2a/MP3b
S: /(Well) maybe under the bed./

I: What makes you think that?
MP2a/MP3a
S: /(Well) because that's probably where he found the other one./ He
MP2a/MP3a →
probably is used to just (grabbing) going under his bed/and then
grabbing both of them out/but maybe one of them's further under/he
could just reach one./

I: Are you wondering anything about what you read?
MP1 MP1
S: /Yeah, what he's going to do/and what the mom's going to do./

I: What do you think he's going to do?
MP2a/MP3b
S: /Probably going to go upstairs with his mom./

Inference Question 3: /Probably his sister and brother of the
MP2a/MP3b
family. /

I: What makes you think that?
MP2a/MP3a
S: /Because it sounds as if it's pretty early in the morning/(and)
MP3a
because she's reading the morning paper/and I don't think that they

MP2a/MP3a
would be there then./

I: Why not?

MP3a →
S: /Because it's so early in the morning/they wouldn't be there if they were their friends./

Episode 4:

MP3b
S: /Now he's getting mad at the mom/because she's always putting stuff
MP3a
away/and (now) suddenly he remembers he had it on Wednesday playing
TS MP2a/MP3b MP3b
in the gym/so he'll probably go into the gym/the school gym/and look
MP3b ⌒ MP2b MP3b
for his sneaker there / or the lost and found./

I: How do you know that he's getting mad at his mother?

MP4
S: /Because (he goes), "Oh, yeah, lady."/and "You're always putting
MP3a
stuff where people can't find it."/

I: So what do you think about what you read?

S: /The Kid sounds like (he's...he isn't brought up...like) he thinks
MP3b MP3a
he can boss his mom around/his mom isn't very strict or hard on him/
MP3a
and that he's got a short temper./
MP3a
Inference Question 4: /Because his mom keeps picking them up/and
MP3a
moving them to different places./

I: Do you have any idea why that happens?

MP2a/CP1 CP2
S: /Probably because she's just lonely/ she has nothing to do/so she's
CP2
just cleaning up the house./

I: Are you wondering anything about what you read?

MP1
S: /Yeah, (if they) when they're going to find the sneaker./

Episode 5:

TS
S: /Now (they're) he's remembering/and his sister remembers that he went

TS
to a dance also on Wednesday/and that he had a shower before he went
TS
to the dance/(and everything in the bathroom) she was going upstairs
TS TS
to have a rest/and everything in the bathroom was dirty/and there
TS
was towels on the floor (and everything)/and (she's) now she's
CP1
remembering what she's put away./

I: Who? Who are you talking about?

MP3b MP4
S: /The mom./ And then she suddenly goes (acting out behavior)/and so
MP2a/MP3a ⌒ MP2b
that probably means she remembers / or else it's half in her mind
MP3a
where she put the runner./
MP3a
Inference Question 5: /Because she's got the three kids/and she's
MP3a
got to clean up after all of them/so there's probably a lot of stuff
MP3a CP1
to do/and she's got to make supper (and everything)/so she's probably
MP2a/MP3a
tired. /

I: Are you wondering anything about what you read?

MP1
S: /Yeah, if they're going to find it./

Episode 6:

S: /Now she remembers that one of the sneakers was under a half-wet
TS TS
towel/and now she's trying to remember where she put it/after she
MP3b
cleaned up the bathroom./ It was probably still in the bathroom./

Inference Question 6: /Because she was talking about going upstairs
MP3a MP3a
for a rest/and cleaning up the bathroom./

I: Why didn't he want her to talk about that?

MP2a/CP1
S: /Probably because he didn't realize he left his sneakers in there./
CP1
and he just thought she was trying to change the subject./

I: Are you wondering anything about what you read?

MP1
S: /Yeah, if she's going to remember wherever it is./ They'll
MP2a/MP3b
probably find it./

Episode 7:

TS
S: /It was under his bed/and (he didn't) he must not have looked very
P3 P3
good/but (like I said) just grabbing one sneaker out/so that's
MP2a/MP3b →
probably where she put it / after the sneaker was in the bathroom./
MP3a
Inference Question 7: /Because they were happy/that they found the
MP3a MP3a
sneaker/nobody else could./

I: Are you wondering anything about what you read?
CP3a
C: /No./

I: What do you think might happen next?
MP2a/CP2 ⌒ MP2b
S: /He's probably going to go out and play baseball / or say sorry to
MP3b
his mom./

Episode 8:

MP2a/MP3b
S: /It sounds as if he's missing the other sneaker now/ because he's
MP3a MP3a
asking his mom for the other one/cause they found one/so maybe that

sneaker that the kids found is the one that he had in the first
MP2a/CP1
place /and he also said that he was going to take the kids down
TS
for a popsicle./

I: So what do you think about what you read?
MP2a/MP3b
S: /It seems like everything's happening to that kid/he's not having
MP3a
a very good day. /

I: Why would that be?
MP2a/CP1
S: /Probably because he's short-tempered/and he just (he just) speaks
CP2 →
too soon/before he knows what he's saying./

MP3b
Inference Question 8a: /About eleven or twelve./

I: Why do you think that?

MP3a
S: /Because I'm sure no little kid would speak to his mom that way /and
MP3a →
no little kid would go out/and buy their little brother and sister a popsicle./

MP3b
Inference Question 8b: /In the city./

I: Why do you think that?

CP2 →
S: /Because if it was in the country/they wouldn't go five miles to get a popsicle/just because they found his running shoe./

I: Are you wondering anything about what you read?

MP1 →
S: /If that sneaker that the kids found is the real sneaker/or if it's just the sneaker that he had in the first place./

Episode 9:

P3 MP3b
S: /Now she's lost the other sneaker/so they have to find that one/and
TS
her hands are empty/and now I'm sure the kid's getting mad again at
MP3b MP2a/MP3b
his mom/and the kids probably won't get their popsicle./

Inference Question 9a: /Because she didn't want (the kid) her son to
CP2 MP3b
get mad at her anymore/and she just was sort of tense and nervous/
MP3a
because she didn't have the running shoe./

Inference Question 9b: /She couldn't remember anything about the
MP3b
running shoe./

I: So how long do you think it's going to take her to find the running shoe?

CP1
S: /(Well) not very long/(because she didn't) because she was just stand-
CP2 MP2a/CP2
ing in the same place/so she just probably set it down on the desk./

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